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**Labour Supply Problems and Solutions**  
**Econometric Model for the State of Bahrain**

**by**

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**A Thesis submitted for the**  
**degree of Doctor of Philosophy**  
**Department of Actuarial Science and Statistics**  
**City University**  
**London**

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To all natives of the Islands of “Bahrain”, where I learnt and experienced love  
fraternity and peace, starting with the high-ranking of policy makers; and  
particularly H.H. The Amire Shaikh Hamad Bin Isa Al-Khalifa, H.H. Shaikh  
Khalifa Bin Salman Al-Khalifa, the Prime Minister, and ending with each and  
every worker no matter where he or she works or seeking work.

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### **Declaration**

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## Abstract

Despite the intentions of the State of Bahrain to implement significant economic and social changes, and their full, or partial, sponsorship of intensive training programmes, neither have the human resources available been exploited to their full potential, nor have the vocational training programmes managed to equip unemployed workers with the skills needed to compete effectively in the labour market.

Indeed, the picture is hardly encouraging for future generations, and cries out for fundamental changes. Bahrain has poured investments into projects aimed at reaping the benefits of its relative advantages, into exploring and transforming its oil and gas resources, into developing value added products, and human resources. But changes since have created a whole new world, with no market to speak of but a global one. Any decisions on investment should now be guided by the notion that geographical location is no longer a real issue, and that competition is won more by conceptual than by material advantage. A worker's personal opinion of his job has as much impact on competition as the extent and quality of his training. An entirely new system is therefore needed, one that provides social incentives and traditional rewards for the creation of new concepts, ideas and perspectives.

The aim of this thesis, is firstly, to investigate labour supply in Bahrain in a dynamic setting in the light of the neoclassical theory which is based mainly on that labour supply is largely a function of real wage. Secondly, to diagnose the problems and finally to suggest solutions. An econometric model of labour supply for different groups: Bahrainis and non-Bahrainis, primary and secondary workers is introduced. Use is made of cross-section time series data. The econometric contribution of this thesis is the testing of relative wage theory besides the estimation and the identification of labour supply elasticities that can serve as the basis for policy decisions. Unemployment as the most serious economic problem facing Governments is considered in this thesis. Unemployment model is presented and analysed as a function of specific factors that may cause structural unemployment in

the economy of Bahrain. Use is made of secondary data. Then unemployment policies are discussed and finally the conclusion of this thesis with prospects is presented.

## **CHAPTER ONE**

### **Introduction**

The economics of labour has firmly become an area of theoretical and empirical enquiry in the mainstream of economics. It involves all stages of scientific analysis; development of a conceptual framework, hypothesis formulation, hypothesis testing and evaluation of results. Labour is a distinctive field of economics which does merit its own study; because firstly, because labour is an essential ingredient in the production of nearly every commodity, secondly, because labour is a source of income; wages, salaries and the wage component of self employment produce the largest part of the national income of any economy and thirdly, that labour is a human resource, with its impact on human circumstances and social problems.

Because it is a human resource problem, an examination of labour's role within an economic system is more complicated than first expected. Individuals do not always act as if they were maximising a tangible goal, such as income. Because for individuals at work the nature of their job may be as important as their income. These considerations mean that good or ideal labour market theory is difficult to develop.

The analysis of labour supply in particular has an important bearing on different issues of economic and social policy. Debates about welfare and social security inevitably involve questions about work incentives. Controversies about unemployment and other macroeconomic problems often raise questions about microeconomic choices and issues.

Because of its intrinsic interest, and of its relevance to other important issues, human resources in the State of Bahrain form the basis of this thesis. The aim is a thorough and comprehensive study of the behaviour of labour supply in

Bahrain, an investigation of unresolved problems, particularly unemployment, an evaluation of the relevant policies and suggestions for some alternatives in the light of basic economic theory.

Economic ability to create viable jobs, and the flexibility to transform these jobs as circumstances change, both depend to some degree on the macroeconomic environment, so Bahrain's economic environment, labour market conditions and problems that have emerged will be the issues dealt with in the second, third and fourth chapters respectively.

Potential economic growth depends on adequate levels of investment, which in turn require sufficiently high flows of national savings or foreign aid or investment. In the State of Bahrain since 1985 investments as a proportion of gross national account have declined. In 1976 investment reached its peak and then declined by almost 25 percent in 1985. The decline was attributed to both public and private sector. Public consumption and transfer payments crowded out public investment and growing public sector deficits crowded out private investment and raised real interest rates. The recovery in 1991 brought public sector finance into better balance, which is regarded as a key element of a medium term growth strategy. But the years following the Gulf war were not as promising as previously anticipated.

A stable economic environment depends also on price stability and a low inflation rate which does not harm business and household decision making. Effective structural adjustment requires that entrepreneurs, managers and workers all receive undistorted price signals from the markets. Decisions are adversely affected when relative price signals are confused by inflation.

In parallel to the stability, the efficiency and quality of public sector spending should be maximised. Reviewing the main activities of the public sector and implementing changes in the quality of budgets is a difficult and time-consuming

task, but the rewards are potentially great given the rapid increase in public spending in the State of Bahrain. Experience suggests that setting macroeconomic policy in a way that aims to boost growth at a cost of higher inflation would be likely to result in accelerating inflation. Bringing it back under control through the necessary subsequent tightening reflationary policy would almost certainly result in lower average growth over a number of years, implying a significant cost in terms of foregone output and employment and hence income and national saving. In the State of Bahrain during the boom of the 1970's and early 1980's, inflation recorded very high rates associated with high growth rates, but this was followed, from the mid 1980s onwards by relatively very low average growth rate during the attempt of Government policy to curtail inflation.

However, Bahrain's economy through its two phases: oil-producing economy and industrial-based economy, is summarised in the second chapter. It shows that the industrial sector contributes a higher share to the national economy. A comparison of Bahrain with other Gulf countries in terms of relative contribution of oil and manufacturing sectors in GDP in 1993, reveals that while Bahrain's oil contribution was 17.5% its manufacturing contribution was 26.4%, Kuwait's were 35.0% and 10.0% respectively, Oman's 45.0% and 8.0%, Qatar's 34% and 18.5%, Saudi Arabia's 36% and 20% and UAE was 41% and 15% respectively. This means that demand for human resources, particularly human skills must be more important in volume and variety in the State of Bahrain. The investment of capital as we will see in the second chapter must be arriving as a process complementary with human investment, which will be the subject of the third chapter, "Bahrain's labour market".

In Chapter Three, Bahrain's labour market conditions are investigated in the light of the theoretical mechanism of the general labour market in comparison with some industrial countries. Employment and problems arising from it, in Bahrain's labour market are also covered in Chapter Four.

In Chapter Five, the conceptual and theoretical econometric frameworks of labour supply models are introduced. A neoclassical theory of labour supply based on utility maximization in a dynamic setting is adopted in this study. Both basic static and dynamic labour supply functions are illustrated. Dynamic equilibrium and comparative dynamics functions are used to explain labour participation decision. Also employment and unemployment functions are used to explain labour market behaviour.

The analysis of life cycle labour supply has been an important topic for both macro and micro economic research during the last thirty years. Beginning with the pioneering work of Heckman (1974) and Mincer (1978) numerous studies were carried out that take into account the various aspects of the labour supply decision over the life cycle. Macurdy (1981 and 1985), Lambert (1988), Laisney, Pohlmeier, Staat (1992) summarise the main results and features of the most important papers until the nineties. Recent studies by Shaw (1992), Francesconi (1996), Laisney and Lechner (1996), where various aspects closely connected to labour supply behaviour are investigated, confirm the relevance of research in this field. The main goal of any analysis of labour supply is the identification of labour supply elasticities that can serve as the basis for policy decisions.

In Chapter Six of this thesis a labour supply model in a life cycle setting for each group of primary and secondary workers, Bahrainis and non-Bahrainis, is introduced, measured by labour force participation function. Use is made of cross-section time series data covering the period 1971-1994. The purpose of this analysis is firstly to estimate labour supply as a function of four independent variables: real wage, relative income, unemployment and inflation; secondly, to identify the elasticity for each group, and finally to test permanent and relative wage hypotheses.

Unemployment as one of labour supply components is given special consideration in Chapter Seven. Firstly, an overview of unemployment explanation and other relevant issues is introduced, secondly, a background of unemployment in Bahrain is discussed and finally an unemployment logistic model is analysed. The goal of the unemployment analysis is to examine the national unemployment rate as a function of some factors that may cause structural unemployment. The model is applied on the individual level to all native workers and unemployed, both male and female aged 15 to 60 years old. Use is made of secondary data of Census 1991.

Because of the relevance of unemployment to labour supply on one hand and to social and economic policy on the other hand, this issue is fully considered in Chapter Eight “Unemployment Policies and Evaluation”. It has been found that active policies can strengthen the links between the growth of aggregate demand, job creation and the supply of qualified labour. A higher public spending on active employment schemes for the benefit of the unemployed and those at a disadvantage in the labour market, may lead to wage moderation by strengthening the ability of outsiders, particularly the long term unemployed and first time job seekers, to compete more effectively for jobs. Intensified job placement and counselling programmes aimed at encouraging effective job search by the unemployed, have proved especially cost effective. Countries which reject a policy of wage dispersions as a means to increase employment will have to rely particularly heavily on active labour market education and training programmes.

An effective public employment service is a key element in making active measures (schemes) more effective. This involves integrating the traditional functions of job placement and services with access to active programmes. Ensuring that the public employment service has access to active programmes helps job seekers even when there are few vacancies. The availability of training or job creation programmes can serve as a ‘work test’ for job seekers.

While it is important to provide training for the unemployed, broad training programmes aimed at large groups of the unemployed have seldom proved a good investment, whether for society or for the programme participants. It is careful targeting that will pay dividends. All the protagonists: employers, educational institutions and government should combine their efforts to develop training programmes that respond to regional (local) needs.

Job creation measures are often an important component of active labour policies. Focussing job creation on particular regions and groups can produce better outcomes for programme participants and for society as a whole. In general, young people and the long-term unemployed are the best targets.

However, alternative economic policies for dealing with both natural and non-natural unemployment in the light of findings in this research are considered in the conclusion, Chapter Nine of this thesis.



## **CHAPTER TWO**

### **Bahrain Economy**

#### **2.1 Background**

**2.1.1** For the last five thousand years Bahrain has been known firstly as Dilmun, then Tylos, thereafter Awal and finally Bahrain. Located within 20 miles of the eastern industrial province of Saudi Arabia, Bahrain is approximately 30 miles to the west of Qatar, 270 miles south-east of Kuwait and 270 miles north-east of the United Arab Emirates. Thus an archipelago of nearly 36 islands lying in the centre of the Gulf, endowed with sweet water and surrounded by relatively shallow sea, Bahrain has tended to be an ideal trading post since time immemorial. The wealth of the island is reflected in its trading importance and the richness of its ancient pearling industry attracted the attentions of armies of many peoples, who vied for control.

**2.1.2** Based on the 1991 Census Bahrain's total population was 508037 inhabitants, the population density is almost 731 persons per square kilometre. Bahrain's population density is very high compared to neighbouring states in the area, it is about 172 times the density/km of Oman, 131 times the density/km of Saudi Arabia, 52 times the density/km of the United Arab Emirate, 27 times that of Qatar and 6 times greater than that of Kuwait.

High population densities in the urban areas were relieved by “suburbanisation” of the population and of economic activities. In fact urbanisation was not associated with a flow of rural Bahrainis to urban areas as the case in other countries, but rather with the influx of

foreign immigrants in response to rapid economic development specially during the years 1975 to 1985. The distribution of population into rural and urban is not a relevant characteristic of Bahrain but rather characterised as metropolitan (Table 2.1). Urban's ratio is rapidly increasing from 56.5 in 1941 to 88.4 in 1991, by the expansion of the city through the suburbanisation policy, the land available for further development is rapidly shrinking.

Since 1941, rapid economic changes have been accompanied by a high rate of population growth among Bahrainis and the increasing numbers of foreign workers and their families. The breakdown into Bahrainis and non-Bahrainis and the percentage distribution are shown in Table 2.2, and the annual rate of population growth is presented in Table 2.3. The percentage of non-Bahraini ranged from 17.7% in 1941 to 36.4% in 1991. The population growth of Bahrain increased almost five fold between 1941 and 1991. The speed of growth varied from time to time and the first peak in the early sixties reached 4.3%. Then there was a remarkable drop in 1971 to 2.8% followed by the highest level of growth of 5% in 1981, which means that the population growth is positively associated with the economic growth. This growth experienced another drop in the second half of the eighties, as shown in Table 2.3.

**Table 2.1**

**Population by Urban and Rural  
for the Year 1941-1991**

<b>Census Year</b>	<b>Urban</b>	<b>Rural</b>	<b>Total Population</b>	<b>Urban Ratio</b>
1941	50806	39164	89970	56.5
1950	69071	40579	109650	63.0
1959	112544	30591	143135	78.6
1965	143270	38933	182203	78.6
1971	168819	47259	216078	78.1
1981	283162	67636	350798	80.7
1991	449336	58701	508037	88.4

Source: The Population, Housing, Buildings and Establishments Census - 1991

**Table 2.2**

The Percentage Distribution by Nationality for the Year 1941-1991

Nationality	Year						
	1941	1950	1959	1965	1971	1981	1991
<b>Bahraini</b>	82.2	83.2	83.0	78.9	82.5	68.0	63.6
<b>Non-Bahraini</b>	17.8	16.8	17.0	21.1	17.5	32.0	36.4
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 2.3**

Annual Rate of Population Growth by Nationality for the Year 1941-1991

Nationality	Year					
	1941 1950	1950 1959	1959 1965	1965 1971	1971 1981	1981 1991
<b>Bahraini</b>	2.3	2.9	3.4	3.5	3.0	2.9
<b>Non-Bahraini</b>	1.6	3.1	8.2	-0.2	11.5	4.8
<b>Total</b>	2.2	3.0	4.3	2.8	5.0	3.6

Source: The Population, Housing, Buildings and Establishments Census - 1991

### **2.1.3 Economic Development Characteristics**

Bahrain has experienced rapid economic and social changes. These changes stem from past development, whereas the economic development of other Gulf states stems mainly from the increased international importance of oil as the main source of energy. This early development of Bahrain was due to the following three reasons: Firstly, economic and social development in Bahrain began prior to the epoch of oil, namely through "the epoch of pearls", which was early in the twentieth century when education and health facilities were established. Bahrain's development was facilitated by its ancient commercial, trading and maritime tradition in the first place. Secondly; Bahrain's oil exporting activity started at an early date in the 1930's, making Bahrain the first Gulf state to profit from oil revenues. Thirdly; Bahrain's oil exports did not increase rapidly, therefore did not result in rapid economic development such as that which occurred after World War II in other Gulf states, especially in the sixties and seventies. In fact oil production in Bahrain has always been relatively limited. Accordingly, diversification policy is crucial to economic development and has always been the goal of Bahrain's government. In addition to refining activities, Bahrain became a major producer of aluminium and petro-chemicals in the region. Bahrain is also a major centre for financial, banking, communication and other services in the region. The Bahrain installations of ship repairing and engineering are among the largest and most advanced of their kind in the region.

## **2.2    The Oil Producing Economy**

### **2.2.1    Introduction**

Prior to the discovery of oil in 1932, Bahrain's economy had been characterised by the pearl-fishing, agriculture and trade. The first two attracted a large number of labourers. Trade, although it did not employ a large number of workers, was nevertheless important in that it provided the major source of revenue for the state. There were of course many other smaller industries with less potential for employment; e.g. copperwork, pottery, boat building and weaving. These manufactures were limited and met local demand only, and they did not represent a significant contribution to state revenues.

Regarding Bahrain's ancient pearling industry, Bahrain's pearls have been famous from earliest times, and were recorded as the "fish eyes" of Dilmun in an Assyrian inscription of 2000 B.C. With the establishment of Bahrain's mercantile fleet in the 1780s, Bahrain had a great influence on the pearl trade and market in the region.

Bahrain's pearl industry provided the major source of income and employment for Bahrain's inhabitants. A small tax was levied on each boat by the Government, and customs duties through the pearl trade were the main source of Government revenue. It was not until the 1930s, when the great depression extended to Bahrain, following the 1920s international monetary crisis and the rise in importance of the Japanese cultured pearl industry, that Bahrain's pearl trade fell by 40%.

The second most important economic source of income for Bahrain was agriculture. The cultivation of date palms had been a major

agricultural activity for hundreds of years. Dates constituted a major part of the stable diet, and the palm provided materials for housing, matting, fuel and fishing. By the early 20th century, and following the increase in the number of artesian wells, as the reduced water-head created water shortages, the dependence on agriculture generally declined. On the other hand the discovery of oil increased prosperity and the importation of food, which in turn reduced the demand for local agricultural products.

**2.2.2** On 1st June 1932 oil began to flow producing 9600 barrels per day placing Bahrain as the first Gulf state that discovered oil.

In 1972 the production of crude oil continued to increase until it reached its peak of 16 thousand barrels per day. Production started to decline as the field became exhausted. In order to preserve such wealth and to extend the oil's life, extensive techniques of development and maintenance by the Government-owned company (BANOCO) was carried out to maintain the production at a level of 42 thousand barrels a day, until the end of the century, with a gradual decrease in the production of crude oil on shore.

Prospects for new oil discoveries are not high, although exploration, especially offshore, which began in the 1980s has continued ever since. A major source of oil revenue is Bahrain's share of output in the "Abu Saafa" offshore oil field. This share is about 140 thousand barrels per day.

Since diversification policy was implemented by the Government in the 1970s, and as the industrial sector in Bahrain mainly relies on gas as a source of energy, Bahrain National Gas Company (BANAGAS) was set-up in 1979 to exploit gas resources, and to supply Bahrain's

industries with their essential requirements, besides providing employment and training opportunities for Bahraini nationals. Gas reserves have an estimated life of about 60 years.

Bahrain took advantage of the presence of huge regional oil reserves to develop a large refinery industry with a capacity of 250,000 barrels per day. Most of the crude oil arrives via a submarine pipeline from Saudi Arabia. More than 95 percent of production is exported, mainly to the Gulf countries, Africa, Asia and the Far East. Plans are under consideration to modernise and upgrade the refinery to maximise output of high yield products.

Generally, the oil and gas industry has created sizeable opportunities for Bahraini employment (more details in the second Chapter).

**2.2.3** Of the traditional industries, fishing remains a relatively important activity. Increased demand and costs highlighted the need to improve on the traditional methods of fishing. A private company with 60% Bahraini capital and 40% non Bahraini was established in 1967, using a fleet of 15 trawlers for shrimp fishing. At first, the catch was exported mainly to the USA and Japan until 1978 when Government took over the industry and started selling the entire output domestically.

Although there have been improvements in Bahrain's trawler fleet and fishing methods which has resulted in a marked increase in output in recent years, Gulf waters are unable to support a large modern fishing industry. Furthermore, increasing pollution has slowed the growth in fishing catches. In order to narrow the gap between the local demand and supply, Government policy is directed towards developing new



facilities, new techniques and the provision of incentives such as subsidised equipment.

Because of the strategic location of Bahrain as a distribution centre, the growth of foreign trade encouraged expansion of the merchant sector which by means of duties and tariffs contributed the major part of the national economy. Customs and duties accounted for 97% of total Government revenue in 1930. In 1953, the time of international economic recovery, after the war, Bahrain's Government decided to construct a deep water anchorage at the capital, Manama to improve ship loading capability.

**2.2.4** Generally, during the 1950s and 1960s, Bahrain's economic development progressed rapidly. Government revenue increased by 247% from 1940 to 1950, oil revenue increased by 198% while non oil revenue increased by 335%. Total expenditure for the same period, from 1940 to 1950, increased by 332%, from which recurrent expenditure rose by 243% while capital expenditure rose by 1053%. During the period from the 1950s to the 1960s social and economic development improved significantly. Capital expenditure on social and economic services increased by 235%, while on the infrastructure base, it increased by 201% and on public administration by 880%. During the same period oil revenue increased by 464% and non-oil revenue rose by 213%, which constituted total revenue increase of 351%.

Compared to the period from the 1960s to the 1970s, the total revenue increased by 89%, in which the oil revenue increased by 85%, while the non-oil revenue increased by 97%. In terms of capital expenditure on social and economic services, there was a decline of 16% and on public administration a decline of 12%, while the capital expenditure

on the infrastructure sector showed a significant increase of 385%. Recurrent expenditure during the same period recorded an increase of 260% on public administration, 212% on social and economic services and a 242% increase on the infrastructure sector. These figures reflected the stability of the infrastructure development that was necessary to meet the requirements of social and economic development programmes. During the 1960s to 1970s, Bahrain's gross domestic product (GDP) increased by 140%, a growth rate of nearly 14 percent per annum. Gross national product per capita doubled by the end of the decade.

**2.2.5** Having mentioned some economic developments over the past forty years, we could conclude that, the discovery of oil in the early 1930s, after the collapse of the pearl industry in Bahrain, is considered a turning point in the social economic history of Bahrain. Oil has become the main resource and national income of the state. State wealth has transformed the economy of the pearl-trade, fishing and agriculture phase into a more evolving economy of an industrial phase. Although the oil revenue has constituted the major source of Government income for the last fifty years, it started declining, as is shown in Table 2.4. This clearly reflected the Government policy of diversification of Bahrain's economy when it established the Development Bureau in 1967 (currently the Ministry of Oil and Industry).

However, growing revenues from oil wealth enabled the Government to accelerate social and economic development programs, as mentioned earlier. Funds became available to build the well-developed infrastructure of Bahrain's economy and to establish new energy-intensive oil-based industries through the Government's investment. Table 2.5 shows the increase in this investment until it started to decline in the mid 1980s when the deficit problem occurred.

**Table 2.4**

Percentage of Oil Revenue and Budgetary Status  
for the Period 1974-1994 (in Million BD)

<b>Year</b>	<b>Total Revenue</b>	<b>Oil Revenue</b>	<b>Oil Revenue %</b>	<b>Total Expenditure</b>	<b>Surplus Deficit</b>
1974	124.0	104.0	83.8	78.0	45.9
1975	135.0	111.2	82.4	122.0	13.2
1976	191.3	157.0	81.9	202.0	-10.4
1977	261.0	181.2	69.5	256.3	4.3
1978	274.0	192.3	70.2	282.1	-8.1
1979	304.2	161.0	52.8	250.1	54.1
1980	446.0	321.0	71.9	308.1	137.9
1981	537.0	399.2	74.4	375.0	161.9
1982	555.0	402.0	72.4	454.0	101.0
1983	484.1	327.0	67.9	518.0	-33.8
1984	511.5	354.5	69.5	528.0	-16.4
1985	531.4	374.0	70.6	496.8	34.6
1986	425.0	246.1	58.2	476.6	-51.6
1987	427.1	247.1	58.2	455.0	-27.9
1988	401.3	209.9	52.3	482.1	-80.8
1989	438.0	247.4	56.5	495.8	-57.8
1990	497.6	306.7	61.6	536.8	-39.2
1991	511.8	306.3	59.8	534.3	-22.5
1992	511.8	289.0	56.5	583.6	-71.8
1993	561.5	347.3	61.8	626.4	-64.9
1994	526.6	285.1	54.1	656.8	-130.2

**Table 2.5**

Percentage of Investment to Total Public Expenditure  
for the Period 1974-1994 (in Thousand BD)

<b>Year</b>	<b>Total Expenditure</b>	<b>Current Expenditure</b>	<b>Investment Expenditure</b>	<b>Investment as % of Total Expenditure</b>
1974	77856	44302	33554	43.1
1975	121768	67586	54182	44.5
1976	201735	86851	114884	56.9
1977	256309	113721	142588	55.6
1978	282078	133760	148318	52.6
1979	250084	152371	97713	39.1
1980	308133	183382	124751	40.5
1981	374706	224707	149999	40.0
1982	453832	279470	174362	38.4
1983	517875	295539	222336	42.9
1984	527576	317590	209986	39.8
1985	508548	344200	164348	32.3
1986	473424	333175	140249	29.6
1987	456905	346460	110445	24.2
1988	478607	373529	105078	22.0
1989	495962	391787	104175	21.0
1990	536649	415305	121344	22.6
1991	534300	433800	100500	18.8
1992	583600	469900	113700	19.5
1993	626500	513500	113000	18.0
1994	656800	529100	127700	19.4

## **2.3    The Industrial-based Economy**

**2.3.1** In view of the likely exhaustion of the country's oil resources the Government was fully aware of the need to diversify the economic base in Bahrain's long-term strategies.

In 1975, the Ministry of Development and Industry was established to implement the diversification strategy that was planned by the Development Bureau. The main objectives of the new strategy beside economic base diversity was to increase employment opportunities and foreign currency revenues, and to create an impetus for developing private sector investment taking part in building an industrial based economy. Prospects for expansion of the industrial base to utilise indigenous resources were given priority, for example, the utilisation of gas either as a fuel or as raw material for chemical industries.

Gulf Petrochemical Industries Company (GPIC), a project established in 1979 by Bahrain's Government in co-operation with public and private sectors in neighbouring countries, was a project which contributed towards employing more national manpower.

The transition of Bahrain's economy from its dependency on the primary production of oil can be broadly gauged by the components of GDP through the years 1975-1994 (Table 2.6); the oil GDP contribution declined rapidly from 32.0% in 1975 to 15% of total GDP in 1994 and the non-oil GDP contribution climbed from 68.0% in 1975 to 84.2% of the total GDP in 1994.

The strategic choices for planning a sustained long-term industrial-based economy, could be clearly demonstrated by figures in Table 2.7.

Despite the fluctuations in the GDP components growth rate due to instability, manufacturing's component sustained almost the same growth rate. Although it climbed from 25.1% in 1976 to 50.1% in 1979, it remained, despite the recession, at a growth rate of 25.0% during 1994. Meanwhile, the trade component growth rate actually declined from 71.2% in 1976 to 5.6% in 1994. Similarly, the GDP component of the finance and real estate services declined from 99.7% in 1976 to -0.8% in 1994. This decline was due to instability caused by the first Gulf war during the 1980s, followed by the second Gulf war in 1990.

But since there was no large local market for domestic products in the country, reviewed plans were, therefore, considered towards promoting capital and energy intensive industries with a strong export orientation. One of the most noteworthy successful projects was Aluminium Bahrain (ALBA), established in 1971. ALBA's smelter utilises natural gas and it is the largest source of employment.

Another major project is the Arab Shipbuilding and Repair Yard (ASRY) dry-dock, which was established in 1974. ASRY's location at the heart of one of the world's busiest lanes, combined with the advantage of skilled labour and a well developed infrastructure, made Bahrain an appropriate choice as the site for this joint venture.

In order to boost its industrial policy, the Bahrain Government expanded the industrial free zone to up to 8 million square feet; firms are exempted from import tax on most capital goods and all raw materials. There are incentives to encourage investments in the private sector, such as: free land, provision of natural gas at nominal prices, absence of income tax and customs duties and of restrictions on profit repatriation and other facilities at subsidised rates.

**Table 2.6**

**Oil and Non-oil GDP Contribution for the Period 1975-1994**

**(in Million BD)**

<b>Year</b>	<b>Total GDP</b>	<b>Oil GDP</b>		<b>Non Oil GDP</b>	
		<b>Million BD</b>	<b>%</b>	<b>Million BD</b>	<b>%</b>
1975	382.2	122.2	32.0	260.0	68.0
1976	550.3	157.1	28.5	393.2	71.5
1977	692.2	187.4	27.1	504.8	72.9
1978	774.2	202.3	26.1	571.9	73.9
1979	909.3	233.9	25.7	675.4	74.3
1980	1167.9	402.1	34.4	765.8	65.6
1981	1309.0	429.4	32.8	879.6	67.2
1982	1376.7	404.4	29.4	972.3	70.6
1983	1440.2	347.7	24.1	1092.5	75.9
1984	1483.5	347.0	23.4	1136.5	76.6
1985	1373.1	384.4	28.0	988.7	72.0
1986	1147.7	210.1	18.3	937.6	81.7
1987	1166.1	207.9	17.8	958.2	82.2
1988	1280.5	178.3	13.9	1102.2	86.1
1989	1374.1	224.0	16.3	1150.1	83.7
1990	1506.3	312.9	20.8	1193.4	79.2
1991	1594.8	282.3	17.7	1312.5	82.3
1992	1666.8	279.2	16.8	1387.6	83.2
1993	1747.6	292.5	16.7	1455.1	83.3
1994	1803.3	284.4	15.8	1518.9	84.2

**Table 2.7**

Non-oil GDP Growth Rate for Main Economic Activities for the Period 1975-1994

At Current Market Prices (in Million BD)

<b>Year</b>	<b>Manufacturing Million BD</b>	<b>Growth Rate</b>	<b>Trade, Hotel &amp; Rest Million BD</b>	<b>Growth Rate</b>	<b>Finance, Million BD</b>	<b>Growth Rate</b>
1975	63.8	-	48.7	-	32.5	-
1976	79.8	25.1	83.4	71.2	64.9	99.7
1977	82.7	3.6	101.3	21.5	93.0	43.3
1978	91.5	10.6	104.6	3.2	124.0	33.3
1979	137.3	50.1	107.2	2.5	130.5	5.2
1980	187.9	36.9	135.3	26.2	175.7	34.6
1981	202.3	7.7	139.7	3.3	260.3	48.2
1982	170.1	-15.9	158.7	13.6	355.6	36.6
1983	167.2	-1.7	177.2	11.7	404.0	13.6
1984	182.8	9.3	141.9	-19.9	410.0	1.5
1985	138.8	-24.1	119.5	-15.8	326.7	-20.3
1986	164.2	18.3	109.0	-8.8	267.3	-18.2
1987	190.9	16.3	117.8	8.1	216.4	-19.0
1988	235.9	23.5	135.5	15.0	289.9	33.9
1989	232.2	-1.6	137.1	1.2	289.5	-0.1
1990	251.9	8.5	147.9	7.9	272.8	-5.8
1991	265.5	5.4	168.6	14.0	275.2	0.9
1992	251.6	-5.2	201.1	19.3	323.5	17.6
1993	257.3	2.3	197.4	-1.8	369.3	14.2
1994	321.6	25.0	208.4	5.6	366.2	-0.8



**2.3.2** Unlike other Gulf countries, Bahrain's strategy of economic planning has been outward looking. With a lack of natural resources, but with a large-scale dependence on export growth, Bahrain has become a centre of international trade and financial services besides developing an export oriented industrial sector. The credit facilities offered by the banks working in the state to the commercial sectors increased by 146% from 1981 to 1984, manufacturing and trade had the biggest share of these facilities. OBUs played an important role as contributors to the nation's income and foreign exchange earnings through commercial registration and licence fees. Banking services were an important source for national employment but since the recession in the mid 1980s, growth rates of the main sectors of the economy have dropped as presented in Table 2.7. Consequently, levels of employment have declined remarkably. This issue will be considered in the following Chapters.

For development planning, Bahrain's fiscal policy has been to rely on external credits for those projects which, over a period of time, are likely to generate sufficient foreign exchange to service the related foreign debt obligations. Generally, external project financing is not encouraged because the benefits derived from such funding tend to be somewhat smaller than the external costs. It has been found that the development of national resources for financing is a better strategy, the funds involved remain within the domestic economy. The recent policy is, therefore, to discourage financing schemes which rely on foreign borrowing and gradually, to move towards schemes and projects which can be financed from domestic resources.

However, Bahrain's fiscal policy and its influence on levels of employment over the past two decades will be considered in Chapter Eight and Nine of this Thesis.

## **CHAPTER THREE**

### **Bahrain's Labour Market**

#### **3.1 The Nature of Labour Market Analysis**

Of the many markets that exist in a modern economy the market for labour is the most important. It is from selling their services in this market that most families derive their income, it is also in this market that they spend the single longest part of their working hours. When not working many individuals devote a large part of the remaining time to acquiring the skills necessary for effective performance in this market. On the other hand, the education and training of individuals during their lives is chiefly designed to equip them with skills which enhance their performance in the labour market. Moreover from their activities in the labour market individuals derive their self-esteem and form friendships and ties that determine many of the parameters of their social life.

Mainly, for most people work is a source of disutility and they therefore require payment to compensate them for the time they devote to it. In the market for labour the essential transaction is therefore the exchange of work for pay. The efficiency with which exchange in the labour market is accomplished is a principal determinant of the efficiency of the economy as a whole. Delays and impediments in exchange result in costs which take the form of output that is forgone, output that could have been produced had labour been available. These occurrences diminish the volume of goods and services available to support the standard of living of the citizen of the country and therefore the efficiency of labour market exchange is of a vital concern to policy makers.

In the labour market, whether it is competitive or monopolized, exchange will often be governed by rules, informal understandings or practices of a

customary nature which influence the behaviour of both parties, buyer and seller of labour services. These rules often emphasize consideration of fairness, but the meaning of such a concept is likely to differ substantially between countries.

### **3.2 Labour Market Mechanism Interpretation**

In fact analytical framework for interpreting labour market is provided by the microeconomic concepts of supply and demand. A supply function representing the behaviour of the sellers of labour (workers) and a demand function representing the behaviour of the buyers or demanders of labour (employer) are developed for each labour market. The price (wage) and quantity (employment) of labour exchanged are determined by the point of interaction of the two functions:

**Labour supply:** A supply curve as depicted in Figure 3.1 is drawn to indicate the amount of labour that individuals are willing to supply at each wage rate. There can be many sellers and therefore competition in supply, or just one seller, a case of monopolist.

**Labour demand:** A labour demand curve (Figure 3.1) representing the demand for labour by a single firm or number of firms. Buyers of labour require the services of labour not as an end in itself, but in order to produce commodities that are for sale or delivery in some product market. The demand for labour is therefore a derived demand, derived from the demand for the final commodity that labour produces and the price that the buyer of labour is willing to pay is related to the market value of an employee's output.

## Labour Market Equilibrium

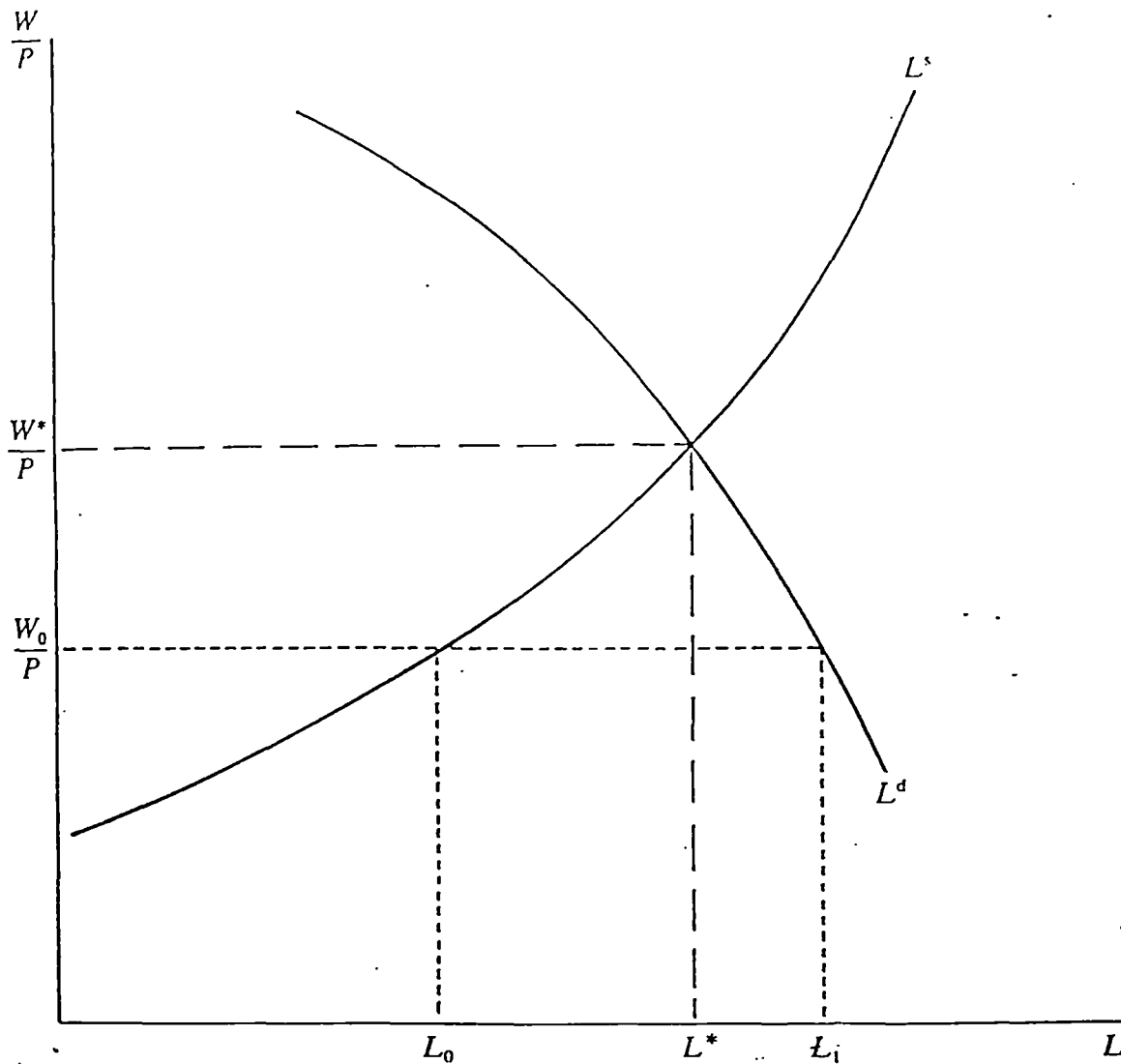


Figure 3.1

Equilibrium in the labour market is described by the point at which the labour supply and the labour demand curves intersect.  $W^*/P$  and  $L^*$  represent the equilibrium real wage and level of employment respectively. If the wage were initially established below this, at a level  $W_0/P$ , there would be an excess demand for labour, equal to  $L_1 - L_0$ . Competition among buyers of labour would then bid up the wage until it reached  $W^*/P$ . Only at  $W^*/P$  and  $L^*$  there is no tendency for the wage and employment to change.

### **3.3 Labour Market Equilibrium**

Obviously demand and supply exert coordinated influences on wages. The two blades of the scissors taken together (Figure 3.1) illustrate the determination of equilibrium price and quantity. The point at which the amount of labour that sellers wish to supply is exactly equal to the amount of labour that is demanded. any competition among employers for the available labour would lead them to bid up money wages and at unchanged general prices, this would result in a rise in real wages. The effect of this rising in turn would be both to reduce the excess demand for labour and to induce additional labour supply. As a result labour demand would fall back and labour supply would rise. Equilibrium would thus be established as a result of employers cutting back their labour requirements in the face of rising wages and more individuals being attracted to work by the higher wages on offer. At this point where no tendency for wages or employment to change is a position of equilibrium.

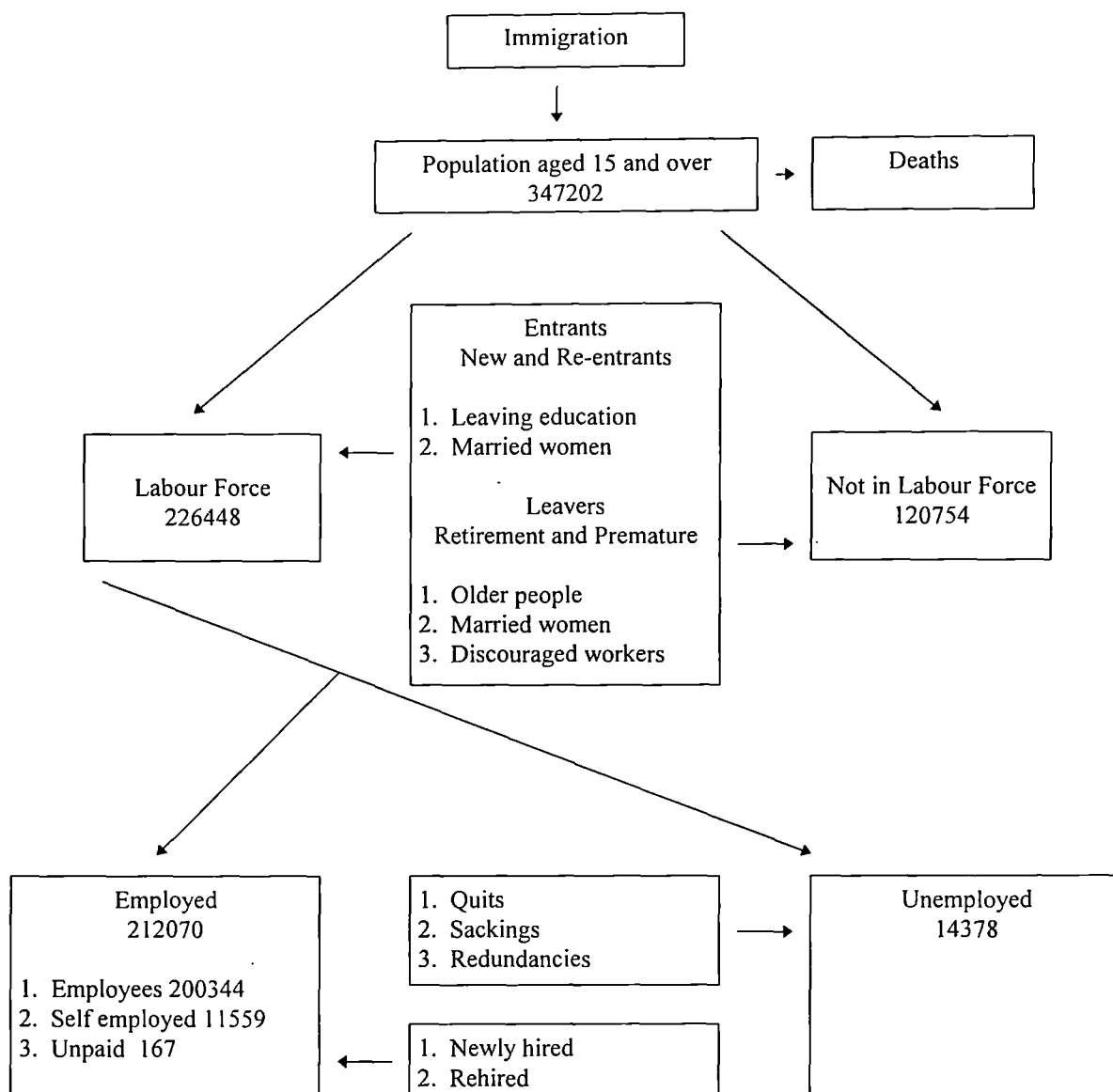
### **3.4 Labour Market Flows**

The equilibrium depicted in Figure 3.1 comprised a stock of individuals with jobs and when out of equilibrium a further stock of individuals who were involuntarily unemployed. Lying behind these two was a further stock, the population of working age and (as detailed in the coming Chapters) the positive slope to the labour supply function suggested that as the real wage rose an increasing proportion of this stock sought work. The size of each of these stocks differs substantially from Country to Country and they are in a constant state of flux. There are continuous flows of individuals between employment and unemployment and into and out of the labour force. Most individuals who leave one job take another immediately, but some people have no job waiting, and either retire from the labour force or enter unemployment.

Most analysis of labour market rely on information that offer only a one-off snapshot or at best a series of snapshots of the state of the labour market at different points in time. Therefore the analysis tends to focus on stocks rather than flows in order to build up a picture of such flows. Figure 3.2 presents snap-shots of the magnitude of the major labour market stocks (the employed, the unemployed and the labour force) for the State of Bahrain in 1991. The population of age 15 and over is increased by flows of immigrants and is diminished by deaths or by back to the sending Country. In 1971 the working age population numbered 120579 while it was 85523 in 1959. By 1991 the population of working age had increased to 347202. In any one year there will be a change in the labour market of a substantial labour force. Those leaving education for the first time constitute the majority of new entrants to the labour force. Alongside there will be re-entrants among whom married women returning after a temporary absence. There are also large flows in the other direction reflecting similar arguments to those. In terms of leavers, retirement is prominent among those leaving the labour force, married women to perform other forms of non-market work and individuals of both sexes who either re-enter full-time education or drop out of the labour force because they fail at finding a job. These later are referred to as discouraged workers. In Bahrain's labour market, the labour force increased from 60011 in 1971 to 226448 in 1991.

Within the labour force there is constant turnover as workers voluntarily leave one job before entering another, these are quits. Quits are one of the routes by which individuals enter unemployment. Redundancies are involuntarily job loss. In the State of Bahrain unemployed people raised from 8241 in 1981 to 14378 in 1991.

## Labour Market Flows in the State of Bahrain in 1991



### Figure 3.2

### 3.5.1 Labour Market Development

Equilibrium wages and employment are constantly changing. Over the period from 1960 to 1985 there was a rise in real wages and employment in almost all countries. It is most striking, that old and new equilibrium of price and employment in different countries is different.

Changes in growth of wage and employment over the period 1971-1994 in the State of Bahrain is considered in Tables 3.1 and 3.2. Change in the money wages rose by 189.2 per cent from 1971-1994. Comparing with major industrialized countries, it rose by 307.5 per cent in USA and 500.5 in Germany, 1153.1 in UK and 1058.3 in Japan for the period 1960-1985.

Change in money wages  $W$  has evidently been accompanied by a change in prices  $P$  in the same direction. For the change in real wages  $W/P$  over the same period is dramatically less. In the State of Bahrain it rose by 4.3 per cent for the period 1971-1994, while it raised by 13.2 in USA, 131.5 in Germany, 69.4 in UK and 152.3 percent in Japan for the period 1960-1985.



**Table 3.1**

**The Growth of Wage During the Period 1971-1994**

	Money (%)	Real (%)
1971-1979	120.2	2.5
1980-1986	61.2	3.2
1987-1994	7.8	1.2
1971-1994	189.2	4.3

**Table 3.2**

**Employment Growth 1971-1994**

		Percentage Change
1971-1979	58243-122044	109.5
1980-1986	129956-173576	33.6
1987-1994	178312-230357	29.1
1971-1994	58243-230357	295.4

### **3.5.2 Changes in Employment**

Over almost the quarter of a century, from 1971-1994 employment has increased by 295.4 percent in the State of Bahrain, comparing with major industrialised countries, it rose by 61.0 in USA, -2.7 in Germany, 1.8 in UK and 30.9 in Japan during the period 1960-1985. The magnitude of the rise in employment and the accompanying much more modest rise in real wages suggests that both labour supply and demand have risen substantially in the State of Bahrain.

### **3.5.3 Changes in Labour Supply**

The long-run changes in labour supply as mentioned earlier can result from either a change in the working age population or a change in participation rate. The number of working age population in the State of Bahrain has by far a very large growth in these age groups. It grew by 189.9 percent through the period 1971-1991. In USA, working age population grew by 50.4 percent, 18.8 in Germany, 13.4 in UK and by 45.1 in Japan through the quarter of a century 1960-1985. In terms of participation rate, in Bahrain it has increased by 14.9 percent over the period 1971 to 1991, while it has grown by 5.4 percent in USA, has diminished by -7.0 in Germany, -1.8 in UK and -6.2 in Japan through the period 1960-1985.

### **3.5.4 Changes in Labour Demand**

Substantial increases in labour demand were required to accommodate the accelerating increase in labour supply that is found. One positive aspect in the growth of labour demand is labour productivity, output per unit of labour employed. An

increase in the amount of output each person produces will result in an increase in the labour demand schedule and at unchanged wage rates will result in more people being employed.

Evidently, the rate of productivity growth is varied substantially across different countries. In the State of Bahrain labour productivity growth was 14.4 percent for the period 1971-1994. In USA it is 38.1 percent, 119.8 in Germany, 72.3 in UK and 290.5 in Japan for the period 1960-1985. However, as we have seen from Tables 3.1 and 3.2, both real wages and employment rose. The growth in productivity has therefore facilitated an increase in both real wages and employment. A measure of the growth in real labour demand can be obtained by taking the product of multiplying real wage growth in Table 3.1 (4.3) and employment growth in Table 3.2 (295.4). Thus in the State of Bahrain the growth in real labour demand 1270.22 was sufficient to support a growth in real wages of 4.3 percent over the period 1971 to 1994 and a growth in employment of 295.4 percent over the same period. In the USA real growth in labour demand was 182.3 percent, 225.2 percent in Germany, 172.4 in the UK and 330.3 percent in Japan over the period 1960 to 1985.

In fact these results emphasize the striking differences in the experience of these countries. Thus the real growth in labour demand in Bahrain, even was more than in the UK. But while this growth largely went into creating extra jobs, in the UK it was almost wholly channeled into extra pay. However, we can see that this in part was because the extra workers in Bahrain labour market were more readily available than in the UK. Firstly as a result of the growth in working age population and secondly as a consequence of Bahrain policies to allow more immigrants into the country (more details later). While in the UK the large wage

risers captured almost completely the gain from the real growth in labour demand.

### **3.6 The Economic Determinants of Population Changes**

In fact, there are two principal aspects of labour supply in the long run; the size of the population of working age and the skills possessed by that population. In terms of population changes, economics has a large effect on these changes. Although the population size was determined by both fertility and mortality rates, the essential check on population is the subsistence level of income. The modern approach to fertility regards children as a consumption good and therefore the demand for children is analysed within the framework of consumer demand theory. In the simple model the input of time of the household is assumed fixed, parents devote a constant proportion of their time to rearing their children. Accordingly, if members of the household decide to offer less market work this leaves more time for other non-market activities or leisure. However the number of children is associated with income, whether positively or negatively it depends on the household's taste.

### **3.7 Migration Effect on Population Changes**

For many countries in the world, migration has been an important contribution to changes in labour supply. For some among them it has been the single most important contribution to the changes in labour supply that have taken place over the past forty years.

International Migration, as economic and political fortunes ebb and flow, so do the patterns of labour migration. Gulf states and other oil producing countries were the principal recipients of migrants since 1960s. Migrants have flowed to the State of Bahrain mainly from Indian subcontinent. Some measure of the scale of this migration can be noticed from the

following figures. Foreign or non-Bahraini population as a percentage of total population has climbed from 21% in 1965 to 36% in 1991, while it was 17% in 1941, participation rate of non-Bahrainis has climbed from 77.1 in 1959 to 87.3 in 1991 as indicated in Table 3.3. This is an evidence that the Island has been a host country prior to the oil era.

### **3.7.1 Permanent and Temporary Migration**

Temporary migrants are typically prime age workers who leave most of their family, including their wives and children at home while they migrate to participate in the labour force of another country. Temporary migrants therefore have very high attachment to the labour force of the host country. The participation rate of non-Bahraini was 78.8 percent in 1971 and climbed to 87.3 in 1991. In Germany the participation rate among foreign nationals in 1960s and 1970s was in excess of 80 percent. On the other hand, permanent migrants typically comprise households headed by prime age workers who bring their wives and children with them. The average participation rate of the members of the households of permanent migrants is as a result far lower than that for temporary migrants. Temporary migrants remit a great part of their earnings to the sending country. Table 3.4 shows the foreign workers remittance to their countries, it accounted for 55 percent of over all balance of payment in 1980 in the State of Bahrain, workers remittance has grown, over the period 1980-1986 it increased by 174 percent.

More recently the distinction between temporary and permanent migrants has become blurred. A pattern has now emerged in which the initial migrant is followed in turn by other working members of the migrant's family, to be followed by non-working dependents,

Table 3.3

DEVELOPMENT OF LABOUR FORCE PARTICIPATION DURING THE CENSUS PERIODS  
FROM 1959-1991

YEARS	1959			1965			1971			1981			1991		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
BAHRAINI															
LABOUR FORCE PARTICIPATION (%)	32680	32311	64991	37208	36695	73903	45109	42649	87758	66772	64709	131481	90382	92895	184277
LABOUR FORCE PARTICIPATION (%)	28683	957	29640	30236	995	31231	35884	1843	37727	51949	9250	61199	73118	17544	90662
LABOUR FORCE PARTICIPATION (%)	87.8	3.0	45.6	81.3	2.7	42.3	79.5	4.3	43.0	77.8	14.3	46.5	80.9	18.7	49.2
NON-BAHRAINI															
LABOUR FORCE PARTICIPATION (%)	15743	4789	20532	21394	6300	27894	21517	6776	28293	75860	18847	94707	115734	39841	155575
LABOUR FORCE PARTICIPATION (%)	15443	396	15839	21015	1028	22043	20884	1400	22284	74230	6955	81185	113739	22047	135786
LABOUR FORCE PARTICIPATION (%)	98.1	8.3	77.1	97.3	16.3	79.0	97.1	20.7	78.8	97.9	36.9	85.7	98.3	55.3	87.3
TOTAL															
POPULATION															
LABOUR FORCE PARTICIPATION (%)	48423	37100	85523	58802	42995	101797	66626	49425	116051	142632	83556	226188	206116	133736	339852
LABOUR FORCE PARTICIPATION (%)	44126	1353	45479	51251	2023	53274	56768	3243	60011	126179	16205	142384	186857	39591	226448
LABOUR FORCE PARTICIPATION (%)	91.1	3.6	53.2	87.2	4.7	52.2	85.2	6.6	51.7	88.5	19.4	62.9	90.7	29.6	66.6

Source: Bahrain Census of Population & Housing - 1981.  
The Population, Housing, Buildings and Establishments Census - 1991.

**Table 3.4**

Balance of Payment and Workers Remittances  
for the Period 1977-1994 (in Million BD)

Year	Trade Balances (Net)	Services & Transfers Capital (Net)	Overall Balance	Transfers or workers remittance
1977	-72.4	76.4	4.0	120.0
1978	-59.2	103.2	44.0	150.0
1979	2.7	9.2	11.9	106.4
1980	44.5	147.8	192.3	106.6
1981	83.6	220.4	304.0	119.4
1982	65.9	-11	64.8	121.1
1983	-53.8	100.2	46.4	112.2
1984	-103.6	110.4	6.8	125.4
1985	-78.9	308.7	229.8	151.2
1986	76.3	112.0	35.7	185.6
1987	-106.8	-9.8	-116.6	174.3
1988	-68.4	258.5	190.1	73.0
1989	-113.7	184.5	70.8	74.7
1990	18.4	8.4	26.8	95.2
1991	-226.4	314.3	87.9	114.1
1992	-300.3	145.1	-155.2	101.8
1993	-55.6	32.0	-23.6	121.3
1994	-106.2	146.0	39.8	123.9

wives, children and even elderly relatives. According to the 1981 Census the number of foreign (non-Bahraini) private household was 18,867 which comprises 32 percent of total household in the State of Bahrain, while collective non-Bahraini household accounted for 10 percent of total household. The number of private non-Bahraini household climbed to 26,740 in 1991.

### **3.7.2 Determinants of Migration of Labour**

Migration as investment decision it involves incurring costs now for expected benefits some time in the future. The expected benefits of migration result from being able to sell one's labour in a market in which it commands a higher price.

Because the benefits of migration occur in the future they need to be discounted to reflect the lower value we assign to income received in the future. Generally, individuals are not indifferent to the distinction between income that occurs in the future and income that occurs today. All other things being equal, individual prefer present income and consumption to future income and consumption.

It should be recognised that besides the migration benefits there may be substantial impediments to migration. Perhaps, more than any other aspect of the labour market international migration is heavily regulated by Governments, every country places restrictions on the scale of immigration. Quantity or quality controls are imposed. However, migration decision by individuals is affected by principal considerations that fall into two groups:



1. Pecuniary consideration
  - a) The difference in real wages and fringe benefits between the sending and host countries.
  - b) The probabilities of employment in the sending and host countries.
  - c) Differences in the prospects of promotion and advancement in each country.
  - d) The costs of moving.
2. Social considerations
  - a) Social and cultural environment differences.
  - b) Differences in the physical environment.
  - c) The political climate in the sending and host countries.

Individuals will weigh each of these aspects differently depending on their current circumstances and tastes. Pecuniary considerations, specially wages rates and employment prospects have been shown to play a central role in individuals decisions to migrate. Higher wage rates and lower unemployment rates in the host country are reported as the two most important reasons for migration to Gulf states. Consistent with this there appears to be an inverse relationship between unemployment in the host country and the level of migration.

Estimates of the private returns to migrants suggest that at the beginning, the earnings of immigrants are often lower than the earnings of native workers. However it has also been found that over the years the earnings of migrants to Bahrain grew more rapidly than those of native workers. After 10-15 years the earnings profiles of migrants and native workers crossed with the result that after 20 years the earnings of migrants were higher than

those of native workers. These results are in part due to the fact that during the final stages of life cycle, when earnings are highest, only the most successful migrants remain. It is not implausible to say that immigrants might eventually earn more than natives.

### **3.7.3 The Economic Consequences of Migration**

Migration will have economic consequences for both the host and the sending countries.

The effects will differ according to the type of labour that is migrating and the state of the labour market in the host and sending countries. Indian subcontinent has a large supply of unskilled labour and wages just above subsistence level. In contrast, in the Gulf countries, wages are high to compensate for the perceived disamenity associated with unskilled workers. Individuals from the sending country are prepared to migrate and they require a wage only slightly higher than that of the sending country to defray the costs of migration. Migration on this scale increases the labour supply in the host country. Because in Bahrain labour demand remains unchanged, wages rapidly decrease and employment rises. Some natives retain their jobs and some have lost their jobs so that now fewer natives are employed at higher wages.

Migrants appear to be better off at the expense of the employment and wages of natives of the host country. Indeed there are still gains from migration since the difference between the wage rates in the host and sending countries more than covers the costs of migration. In fact the migration will be expected to continue until the gains will be eliminated, that is until wages in the two countries differ by only the cost of migration between the two countries.

This picture reflects the first round as a result of static rather than dynamic. Looking at the wider picture it is clear that the fall in wages in Bahrain reduces the costs of production of the goods and services that were being produced by unskilled labour. If the product market is competitive, this will result in lower prices and an expansion of the demand for these goods and services, assuming that the demand for these products is almost elastic. The second stage will therefore be an increase in labour demand and then as a consequence wages will rise and employment expand, and if there is no further immigration employment among natives will now rise. Whether employment and wages will return to their previous level cannot be predicted without exact knowledge of the elasticity's of demand for unskilled labour and the products they contribute to produce.

If the product market is monopolized the initial fall in labour costs may result in higher profits because final product prices have been held. In this case the outcome depends on the disposition of these profits. If they are immediately reinvested, to increase the scale of production of these or other products, there will be an increase for labour. If alternatively, profits are distributed as income to the owners of the firm and this leads them to increase their consumption and investment expenditure, it will again generate additional jobs. In addition there is the probability of increased expenditure by the expanded workforce. The change in the total earnings of labour in Bahrain will depend on the elasticity of demand for unskilled labour. If this is elastic, the earnings of the unskilled and their total expenditure will rise, if inelastic, total earnings and expenditure will fall.

Evidently it is hard to predict the outcome of the immigration process in the State of Bahrain, but one thing which is to focus on

is the initial displacement of immigrants by native workers which is only part of the picture.

Distribution of manpower in the State of Bahrain has grown rapidly as indicated in Table 3.3. Through the period 1959 to 1991 it grew from 85523 to 339852. The increase in Bahrain's manpower from 64991 in 1959 to 184277 in 1991 is due to two factors, mainly the rapid increase of graduates at different levels of education and specialization and secondly the increase of women's participation rate, it increased from 3% in 1959 to almost 19 percent in 1991.

The size of non-Bahraini's manpower has fluctuated with the direction and volume of immigration. Immigration between 1959 and 1965 resulted in a 36 percent increase in the manpower. Through the period 1971 to 1981 which was characterised by a high-oil revenue, there was a great demand for labour. Non-Bahraini's manpower increased from 28293 in 1971 to 94707 in 1981 almost 40 percent of total manpower. The proportion of married immigrants has increased, it amounted to almost 67 percent of total immigrants. This has enhanced the notion that the island has been exposed to a flux of unskilled immigrants since the pearl era.

In the following Chapter we will focus on the employment and its influence on the labour market. In Chapter Six, the labour supply models will reveal the economic problems related to wages and unemployment rate prevailing in the market.

## **CHAPTER FOUR**

### **Employment and the Emerged Problems**

#### **4.1 Background**

The overall aims of Bahrainis four year economic and social development plan (1982-1986) were to forge greater cooperation between various sectors of the economy so as to optimise the use of available human and financial resources. The main objective was to create additional jobs for Bahrainis in a setting of economic growth.

Obviously expansion and development of Bahrain's economy has generated much greater growth in some occupations than in others. Changes in the occupational structure of the labour force reflect changes in the manpower requirements of industries in Bahrain. Four economic activities expanded more rapidly over the years 1959-1991, manufacturing, construction, financing and wholesale, retail trade, restaurants and hotels. Agriculture and fishing industry has been decline over the years 1965-1981, but started increasing throughout the years 1981-1991 due to the diversification policy. Transport and communication occupations has increased sharply from 1959 to 1971 during which the fundamental infrastructure was built. Community, social and personal services occupations reached the peak in 1981 and then started growing more steadily in the late 1980s. Men work more in the industrial sector while women, are relatively more in the community, social and personal services occupations.

Employment in Banking and insurance sector has grown very rapidly. The contribution of expatriate in this sector has declined from 47.5 percent in 1979 to 31 percent in 1983 and to 26.7 in 1994.

Oil and gas industries created sizable employment in the labour market. Also Government policy of encouraging domestic and foreign private investment required availability of skilled workers. Therefore Although in the initial stages of Bahrain's economic growth, there was a disparity between domestic skilled workers and the newly created opportunities in the Bahrain market. This problem was solved by implementing programmes which were directed through a strong portfolio of training courses, seminars and workshops supported by one-to-one coaching. This in addition to a great deal of support for hundreds of workers in higher education through a scholarship and sponsorship programme.

Obviously extensive training programmes were set up in public sector in order to qualify Bahrainis to take over the administrative and technical jobs. Contribution of Bahrainis reached almost 83 percent of the total workers in the oil and gas industry, and about 80 percent in the aluminum industry in 1994. This represents the Government's determination not only to achieve its Bahrainization strategy, but also to invest the country's human resources. In the private sector, despite Bahrainization plan which was set up by the Ministry of Labour and Social Affairs for 1989-1994, Bahrain's market is influenced by different factors that determine its labour demand in the long-run. In both the short-run and long-run the elasticity of labour demand will be different in each case. The demand for labour, as defined by the formal theory, is a demand derived from that for the final product which labour cooperates to produce. Firms in the private sector demand labour simply because it is an input into the production process and they produce in order to make profits. The ultimate reason why firms demand labour because it is profitable to do so. Precisely how much labour firms demand depends on a number of factors. First the technical nature of the production process, second the revenue that results from selling the output of labour and finally the prices of the factors of production.

## **4.2 The Nature of Production Process**

The nature of the production process could be measured by the marginal rate of technical substitution between the factors of production. It tells us for a given production technology, the rate at which labour must be substituted for capital in order to maintain a constant level of output.

## **4.3 The Marginal Product of Labour**

In the short run, a period in which labour is the only variable factor of production, if a firm wishes to increase output it has to increase the use of labour. This addition to output that results from one extra unit of labour is called the marginal product of labour. In fact the total output produced by adding successive increment of labour to the fixed capital, first increases at an increasing rate and then increases at a decreasing rate until output reaches a peak. The marginal product of labour depends on first, the nature of production function, second, the size of the capital stock and third, the number of previous units of labour employed, because before last unit of labour was employed, all the other units of labour employed had more capital at their disposal. This means with last unit of labour the available capital is spread more thinly among the workers.

## **4.4 The Marginal Revenue Product of Labour**

The firm is concerned not just with how much output a worker produces but also with the price obtained for this output when it is sold in the market. The price the firm obtains will depend on whether the firm is a price-taker, a perfectly competitive firm or a price-maker, a monopoly in the product market. In the competitive case the firm faces a perfectly elastic demand for its product, this means the price equals the average revenue which in turn equals the marginal revenue. So the firm can sell

all it wants at the prevailing price. In contrast, a monopoly has to lower the price of its output if it wants to sell more. In this case the price does not equal marginal revenue that it lies below the average revenue for there is an additional force at work. In both cases the additional to revenue resulting from selling the product of the last unit of labour employed.

$MRP_L$  can be found by multiplying  $MP_L$  by  $MR = MRP_L$ . Accordingly  $MRP_L$  curve is expected to decline more sharply for monopolistic industry than competitive one.

#### 4.5 The Firms Labour Demand in the Short Run

Having defined the firm's  $MRP_L$ , we are now in a position to describe the labour demand. A profit maximizing firm is concerned to equate marginal cost  $MC$  to marginal revenue  $MR$ . Assume that it purchases labour in a perfectly competitive market, the firm faces an elastic labour supply of labour and the marginal cost of employing an extra unit of labour is the wage rate. In this case  $MC = W$  and since  $MR = MRP_L$  then  $W = MRP_L$ .

The above arguments enable us to identify how much labour the firm will wish to employ at each wage rate, that is to identify the firm's labour demand. The profit maximizing firm will equate  $MR$  to  $MC$  subject to (average)  $AR > AC$ . In labour market terms this means that the profit maximizing firm takes employment up to the point at which  $MRP_L = W$  subject to the  $ARP_L > W$ . If the wage exceeds the  $ARP_L$  the firm would be making losses and clearly will not demand labour at wage in excess of the maximum of the average revenue product of labour



#### 4.6 The Firm's Labour Demand in the Long Run

In the long run both labour and capital are variable. The firm no longer has to work with a particular level of capital. The constraints on the firm's activities are two, technical possibilities open to the firm and second the financial resources of the firm.

In equilibrium each factor of production is employed up to the point of equality between the ratio of its marginal product to the price of that input. This means that the last  $BDI$  spend on capital was as productive no more and no less than the last  $BDI$  spent on labour. In fact this shows the essential conditions for cost minimizing which is in turn an essential precondition for maximizing profits.

To obtain firm's long-run demand for labour we recognize that a change or say a fall in the wage rate does two-things. First it changes relative prices, it lowers wage relative to the price of capital services. Second it makes the firm better off, it reduces the cost of producing a given level of output and therefore either enables the firm to produce the same output for a smaller budget or to produce more output from a given budget.

As we have mentioned earlier the greater the volume of capital that labour has to work with the higher is the marginal product and hence the greater is the value of marginal revenue product of labour at any given level of labour input. In the long-run, the firm is free to vary the amount of capital it uses and it might no longer operate with a given capital, instead the firm chose to buy more capital to increase its capital stock. This larger capital stock gives rise in its marginal revenue product of labour which associated with the new lower wage.

Firm's option whether to use more labour or more capital in facing a fall in wages depends on the substitution and scale effects of the wage rate

change. The substitution effect distinguishes the firm's reaction to the change in the relative price of capital and labour, holding constant the scale of production. The scale or output effect distinguishes the change in the level of output while abstracting from the change in relative prices.

We expect the perfectly competitive firms to produce more output for it can sell all it can produce at the prevailing market price, and the fall in the wage rate has increased the profitability of its operation. In monopoly market, where producers have market power, this may not always occur. If the nature of the production is such that an increase in output results in a fall in total revenue, the firm may decide not to increase output. In this case the final outcome will be determined purely by the substitution effect, and will involve the use of more labour and less capital.

In summary, if the scale effect  $>$  substitution effect, more capital will be used and the long run labour demand curve will be shallower (lesser) than the case of the short run curves. If the scale effect  $<$  substitution effect less capital will be used and the long run demand curve will be steeper (more) than the case of short run.

#### **4.7 The Elasticity of Demand for Labour**

Total wage bill, or the total earnings received by the category of labour changes subject to the elasticity of demand for labour. If the demand is elastic a fall in the wage rate increases the wage bill and a rise in the wage rate reduces the wage bill. On the other hand inelastic demand means a fall in the wage rate reduces the wage bill and a rise in the wage increases the bill.

According to Hicks - Marshall rules the wage elasticity of demand will be higher:

1. The higher is the absolute value of the price elasticity of demand for the final product labour produces.
2. The more easily can other factors of production be substituted for labour.
3. The more elastic the supply of other factors of production.
4. The larger is the share of labour in total costs.

#### **4.8 The Problems of Bahrain's Labour Market**

Having summarized general labour market mechanism, now it is easier to view Bahrain's labour market in the light of this mechanization. The most common feature of this market is the recognition of employment as Bahraini and non-Bahraini or expatriate. Table 4.1 shows the contribution of Bahraini's employment in the industrial establishments, only about 39 percent of total job opportunities is occupied by Bahrainis. The establishments of average employment size 500 and above contributed to almost 65 percent of this share. The establishment of employment size less than 100 employees has Bahrainized only a percentage of maximum 18.8 percent of their labours. The establishments size of 5-9 employees has only 363 Bahrainis of total 3932 job opportunities, almost 9 percent only is offered to Bahraini workers.

Tables 4.2 and 4.3 show the average output product of labour by adding extra unit of labour to the fixed capital, first increase of labour at an increasing rate until it reaches a peak and then starts decreasing unless an addition to the capital stock occurs. A relatively flexible labour market besides the unstable global prices lead large firms to determine its outcome under the constraint of scale effect; e.g. Aluminum Industry. The establishment of employment size 500 and above chose to work with

**Table 4.1**

**PERCENTAGE OF BAHRAINI EMPLOYMENT TO TOTAL  
EMPLOYMENT BY AVERAGE EMPLOYMENT SIZE IN  
INDUSTRIAL FIRMS: 1992**

<b>Average Employment size in Indl. Firms</b>	<b>Total Employment</b>	<b>Percentage of Total Employment</b>	<b>Bahraini Employees</b>	<b>Bahrainis Percentage</b>
1 - 4	2740	7.8	310	11.3
5 - 9	3932	11.2	363	9.1
10 - 19	2416	6.9	304	12.6
20 - 49	2465	7.0	445	18.0
50 - 99	3023	8.6	567	18.8
100 - 199	3905	11.1	1219	31.2
200 - 499	5021	14.3	1615	32.1
500 - 999	3826	10.9	2727	71.3
1000 +	7749	22.2	6098	78.7
<b>Total</b>	<b>35077</b>	<b>100.0</b>	<b>13648</b>	<b>38.9</b>

**Table 4.2**

**VALUE OF INDUSTRIAL OUTPUT PER EMPLOYEE  
BY AVERAGE EMPLOYMENT SIZE OF INDUSTRIAL  
FIRMS: 1992**

**IN THOUSAND BD**

<b>Average Employment size in Indl. Firms</b>	<b>Total Output</b>	<b>Total Employees</b>	<b>Output Per Employee</b>
1 - 4	16363	2740	6.0
5 - 9	25225	3932	6.4
10 - 19	27276	2416	11.3
20 - 49	34915	2465	14.2
50 - 99	52778	3023	17.4
100 - 199	86904	3905	22.2
200 - 499	145806	5021	29.0
500 - 999	813877	3826	212.7
1000+	271483	7749	35.0
<b>Total</b>	<b>1474629</b>	<b>35077</b>	<b>42.0</b>

**Table 4.3**

**VALUE ADDED PER EMPLOYEE IN THE INDL  
SECTOR BY AVERAGE EMPLOYMENT SIZE OF  
INDUSTRIAL FIRMS: 1992**

**IN THOUSAND BD**

<b>Average Employment size</b>	<b>Output Value</b>	<b>Input Value</b>	<b>Number of Employees</b>	<b>Value added per Employee</b>
1 - 4	16363	7443	2740	3.2
5 - 9	25225	11458	3932	3.5
10 - 19	27276	15406	2416	4.9
20 - 49	34915	18615	2465	6.6
50 - 99	52778	25645	3023	9.0
100 - 199	86904	49507	3905	9.50
200 - 499	145806	71149	5021	14.9
500 - 999	813877	414990	3826	104.2
1000+	271483	148421	7749	15.9
<b>Total</b>	<b>1474629</b>	<b>762633</b>	<b>35077</b>	<b>20.1</b>

a great volume of capital uses more skilled workers and technology than the case of other establishments of lesser employment size which are likely to act by the effect of substitution. A profit maximizing firm is concerned to equate marginal cost to marginal revenue. Assume that it purchases labour in a competitive market. The establishment faces relatively elastic labour supply of expatriate (non-Bahrain) labour, its marginal cost of employing an extra employee is the wage rate. In this case, the total cost of compensation of hiring Bahraini labour is much higher than the expatriate labour, Bahraini's employee compensation is three times the expatriates. Obviously small size establishments chose to employ expatriate labour in order to maximize its profits as it is shown in Table 4.4.

Generally, job growth during 1970s and 1980s had taken place in the public and joint sector. However during 1990s, public sector job growth slowed considerably. Self-employment has been rapidly decreasing throughout the last two decades. Unemployment rate among Bahrainis has been increased in almost all the regions in the state represents a waste of human resources, reflects an amount of inefficiency in the economic system and causes a disturbing degree of social distress to the extent that makes it worthwhile considering in Chapter Eight of this Thesis.

The incidence of unemployment rate differs considerably by age-group. Young people typically face a very high rate. Generally, weak employment growth since mid 1980s in the public sector, has been accompanied by a low productivity of growth, achieved mostly through labour-shedding in traditional sectors rather than through shifts of production to high-technology and skill-intensive activities. Wage differentials have widened and real wages for the low-paid workers have fallen. According to latest income and expenditure survey conducted in 1994-1995, average income of non-Bahraini household is much greater than average income of Bahraini household and unemployment rate of

**Table 4.4**

**TOTAL COMPENSATION OF BAHRAINI EMPLOYEES  
TO TOTAL EMPLOYEES BY AVERAGE EMPLOYMENT  
SIZE OF INDUSTRIAL FIRMS: 1992**

**IN THOUSAND BD**

<b>Average Employment size</b>	<b>Total Compensation of Employees</b>	<b>Bahraini's Employees Compensation</b>	<b>% as Bahraini Compensation</b>
1 - 4	2350	85	3.6
5 - 9	4338	256	5.9
10 - 19	3271	504	15.4
20 - 49	4497	1255	27.9
50 - 99	6929	1643	23.7
100 - 199	9778	3793	38.8
200 - 499	18163	9004	49.6
500 - 999	27852	22470	80.1
1000+	66226	48180	72.7
<b>Total</b>	<b>143405</b>	<b>87189</b>	<b>60.8</b>



Bahrainis climbed to 15 percent. An important incidence of long-term unemployment suggesting poorly functioning labour market. However, further evidence is in the subsequent Chapters.

## **CHAPTER FIVE**

### **The Conceptual and the Theoretical Framework**

#### **5.1 The Basic Static Model of Labour Supply**

##### **5.1.1 Introduction**

Economic agents may be taken to reach their decisions in the light of what they want and what they can get. Thus in neoclassical models, labour supply decisions, like consumption and all other decisions, are the result of utility maximization (what agents want) subject to constraints (what they can get). In this framework we shall be dealing with two basic functions: firstly the static supply function and secondly the dynamic supply function.

In the basic static model of the labour supply, the individual's utility  $U$  depends, besides his taste, on the amount of market goods  $C$  (consumption) and hours of leisure time  $L$  that he consumes per period.

In maximising utility, the individual faces several constraints: First, the price of a unit of  $C$  is  $P$  and the price of a unit (an hour) of  $L$  is a fixed amount  $W$  the wage per hour; that is the individual must forgo or sacrifice  $W$  when he devotes an hour to leisure rather than to work. Second, the total amount of time available per period is fixed at  $T$  hours and may be allocated to work hours  $H$  and leisure hours  $L$ . Finally, in the absence of borrowing and saving, spending on market goods  $PC$  must equal total income from work  $WH$  and other income  $V$  derived from other sources.

In formal terms, the individual's problem is to maximise utility, which is a function of  $C$  and  $L$  that is,

$$U = U(C, L) \quad (5.1)$$

by choosing  $C$  and  $L$  values that give him the highest value of  $U$  which is consistent with the budget constraint that is:

$$PC = WH + V \quad (5.2)$$

where total available time per period,  $T$  may be allocated between leisure and work that is:

$$H + L = T \quad (5.3)$$

where the full income is equal to the expenditure on leisure plus the expenditure on the consumer goods that is:

$$WT + V = WL + PC \quad (5.4)$$

That is the maximum income attainable when all time is devoted to work.

The optimal combination of  $C$  and  $L$  is

$$MU_L / MU_C = W / P \quad \text{or} \quad MU_L / W = MU_C / P \quad (5.5)$$

where the marginal utility ( $MU$ ) that would be gained (lost) from spending one more (less) money unit on  $C$  and one less (more) on  $L$  would be just offset by the marginal utility that would be lost (gained) by the reduction (increase) in  $L$ . Any further reallocation

of time from leisure to work, or vice versa would therefore be pointless in case, if wage fell to the extent that is:

$MU_L / W > MU_C / P$  at the optimum. This has a simple and natural economic interpretation: leisure is so cheap ( $W$  is low) relative to the price level  $P$  and the individual's income  $V$  and the utility 'lost' by transforming time from leisure to work is so large in relation to what would be gained from work that the individual devotes all available time to leisure and none to work.

Thus in the basic model, the 'value' of the time of people who do work is given by their wage rate  $W$ ; but the marginal value of time to non-workers exceeds the wage they could earn and depends on their value of  $V$ . Of course if  $V$  changes, other things being equal, people with less income cannot afford to be choosy about working and will be prepared to work for a low wage.

The effects of changes in variables such as  $W$ ,  $V$  or  $P$  on the variables  $L$ ,  $H$  and  $C$  are usually discussed in terms of income and substitution effects. First consider the effect of a wage increase on  $L$ . A wage increase makes it possible to earn more income and get greater utility at any given relative wage price ratio  $W/P$ ; it will therefore have an income effect on leisure. By definition, if leisure is a normal good, then the income effect of the wage increase will cause leisure time to rise and labour supply to fall. The wage increase makes the individual better off, so he can afford to consume more leisure time. However a wage increase also makes an hour of leisure more "expensive" relative to market goods at any level of income. Thus a wage increase will also have a negative substitution effect on the consumption of leisure time and a positive substitution effect on labour supply. The wage increase makes work more attractive so the individual consumes less leisure

time and works longer, thus substituting consumption goods for leisure.

So labour supply schedules may have positive or negative slopes depending on whether the income effect of a wage increase on labour supply is smaller or larger than the substitution effect. For example, if the substitution effect dominates at low wage levels but is outweighed by the income effect at higher wage levels, then the labour supply schedule will bend backwards, with first a positive and then a negative slope.

Other factor, that is differences in tastes may play a powerful role in individual differences in labour supply. Responses to changes in  $V$  (income) or  $P$  (price) can also be analysed in terms of income and substitution effects. A change in consumer prices gives rise to both income and substitution effects (the former because a change in prices alters purchasing power and hence alters income in real terms, the later because a change in prices alters the price of leisure relative to the price of consumption goods). A change in  $V$  income affects income but not the relative price  $W = W / P$  and so has a pure income effect only. The total effect of simultaneous changes in  $W$ , and  $P$  will obviously depend on the relative magnitudes of these changes; but an interesting implication of the model is that if  $W$ ,  $P$  and  $V$  all changes by the same percentage then leisure time (and labour supply) will not change at all. This means that labour supply is not subject to money illusion and that labour supply behaviour is determined by real wage and real income.

### 5.1.2 The Labour Supply Function

The labour supply function for the individual can be illustrated as:

$$H = H(W, V, P) \quad \text{or} \quad H = H(W / P, V / P) \quad (5.6)$$

This defines the optimal or utility maximizing level of labour supply.

By the same definition the optimal  $C$  for the individual may be written as:

$$C = C(W / P, V / P) \quad (5.7)$$

Since,  $U = U(C, L)$

and  $H + L = T$

$$U = U(C, T - H) \quad (5.8)$$

substitute the  $C$  and  $H$  function into the expression from utility (5.8) we obtain

$$U^* = U[C(W / P, V / P)T - H(W / P, V / P)] \quad (5.9)$$

where  $U^*$  is the individual's maximum utility of composites  $C$  and  $H$  functions.

This is "indirect" or maximised utility function, because the key economic variables  $W$ ,  $V$  and  $P$  determine the optimal levels of  $C$

and  $H$  (and therefore  $L$ ) for a given individual with given tastes, so they also determine the individual's maximised utility  $U^*$ . Since the  $C$  and  $L$  functions are derived from a utility function, it follows that demand function for  $C$  and  $L$  (or, equivalent,  $H = T - L$ ) necessarily imply some kind of utility function and vice versa. This relation between the demand function for  $C$  and  $L$  and the indirect utility function (5.9) is identified by Roy [147] as follows:

$$H = T - L = MU_w / MU_v \quad (5.10)$$

$$C = -MU_p / MU_v \quad (5.11)$$

(5.10) means that at the optimum, the amount of labour supplied is equal to the ratio of the marginal utility of a higher wage to the marginal utility of income as indicated in (5.9). (5.11) says that at the optimum, the amount of the consumer good  $C$  demanded is equal to the ratio of the negative of the marginal utility of a higher price to the marginal utility of more income as indicated in (5.9) too.

This implies that given  $MU_w$  function of wages and  $MU_p$  function of prices and income which is homogenous of degree zero in all its arguments, demand function for  $C$  and  $L$  (or equivalently a supply function of  $H$ ) is fully consistent with utility theory.

### 5.1.3 Extension of Basic Model of Labour Supply

The simple model as represented by equation (5.6)

$$H = H(W, V, P)$$

is not one that is suitable for empirical application, because it focuses on the role of pecuniary variables.

However, this does not mean that the model implies that such factors explain all of an individual's labour supply decision or that individual responds only to changes of pecuniary variables, the simple model also implies that tastes, that is preferences affect labour supply decision.

Beside wage, income and price variables other factors such as market conditions, trends, denoted by the array  $\bar{A}$  are added to the model. The extended model can be represented as:

$$H = H(W, V, P, \bar{A}) + E \quad (5.12)$$

where  $E$  is a random error accounts for unobservable variables (including tastes) measurement errors.

Considering how the simple model works during the course of the business cycle, the participation decision and the hours of work decision are really one and the same measure of labour supply.

$$P = P(W, V, P, \bar{A}) + E \quad (5.13)$$

where  $P$  denotes the labour force participation rate (the ratio of employed and unemployed who seek job to the working population 15 years and over).

The adopted labour supply may be written as:

$$P = \alpha_0 + \alpha_1 W + \alpha_2 V + \alpha_3 P + \alpha_4 U + E \quad (5.14)$$



Where

$\alpha$ : represents constant parameter.

$u$ : is unemployment rate variables.

$E$ : normally distributed random errors term.

The parameters are then estimated using least squares technique for various groups.

Besides the theoretical notion of income and substitution effects which has proven to be a particularly useful and analytical construct. The simple model has a very useful feature that helps to understand two important stylized facts about labour supply behaviour during the course of the business cycle. On the one hand overall labour force participation generally falls as the overall unemployment rate rises, a phenomenon that is called the discouraged-worked effect. On the other hand, labour force participation rises among secondary workers as the overall unemployment rises: e.g. married women whose husbands are unemployed, a phenomenon is called the added worker effect.

## **5.2 Dynamic Labour Supply Function**

### **5.2.1 Introduction**

Labour supply model in a dynamic setting have attracted increasing attention in recent years simply because of analyzing the way in which labour supply decisions are taken with an eye to the future and in which the consequences of decisions are spread over time. It involves developing a coherent approach that can explain and

illuminate a wide variety of “stylized empirical facts” about the lifecycle behaviour of people that appear with surprising regularity in a variety of different kinds of data, such stylized facts about the lifecycle include the following features:

1. In general, data for men suggests that the time profiles of labour supply, wage rates and annually earnings are all concave. That is each of these variables tends to rise rapidly early in life and then rise slowly in middle age.
2. The typical man spends the first part of his life in school, often starting to work while still attending school, after leaving school, he generally works more or less continuously until retirement, then he remains out of labour force until death.
3. The typical woman cycles between working in the home and in the market after leaving school. However many women work more or less continuously until retirement.

In fact the simplest way to extend the static model (one period) labour supply to (multiple periods) dynamic model is to consider leisure at any two different dates as two different goods and similarly for consumption. Thus the function for lifetime utility  $U$  is:

$$U = U[C(0), L(0), C(1), L(1), \dots, C(T), L(T)] \quad (5.15)$$

where:

$C(t)$ : is consumption during period  $t$ .

$L(t)$ : is leisure during period  $t$ .

$(t)$ : is the individual's lifetime start at  $t = 0$  and ends at  $t = T$ .

The next step is to specify the dynamic or lifetime budget constraint subject to which lifetime utility  $U$  is maximised. In most dynamic labour supply models, it is assumed that credit markets are perfect, so that the individual may save or borrow at a given market rate of interest  $r$ , another assumption is that the individual has a positive or zero net worth,  $Z$  at the end of his life. Let the level of net worth that the individual possesses at the start of his life denoted by  $Z(0)$ . then the individual's net worth  $Z$  will change over time according to the relation.

$$Z(t+1) - Z(t) = rZ(t) + W(t)H(t) - P(t)C(t) \quad (5.16)$$

where:

$Z(t)$ : is the individuals net worth at time  $t$ .

$W(t)$ : is the wage rate at time  $t$ .

$P(t)$ : is the price level at time  $t$ .

$rZ(t)$ : is the interest earnings on the individual's net worth at time  $t$  (equivalent to the  $V$  of the static model).

$Z(t + 1)$ : is the individual net worth at time  $(t + 1)$ , the requirement is that  $Z(t + 1) \geq 0$ .

With  $Z(0) = Z_0$  an exogenously given constant.

Note that the equation (5.16) is identical to (5.2) the budget constraint of the static model, and that  $Z(t + 1) - Z(t)$  is the change in the individual's net worth between  $t$  and  $t + 1$ , need not be zero. If the right-hand side of (5.16) is positive, meaning that the individual's income  $rZ(t) + W(t) - H(t)$  exceeds his expenditures on consumption good  $P(t) - C(t)$  then the individual is saving (adding to his net worth) whereas if the right-hand side of the equation (5.16) is negative meaning that the individual's income is less than his consumption expenditure, then he is borrowing (reducing his net worth). So equation (5.16) indicates that property or assets  $Z$  can be accumulated or decumulated over time and therefore in a life cycle framework  $rZ(t)$  is a choice variable, because it is a result of prior decision to borrow or save and so forth that affect today's net worth  $Z(t)$ .

It is worth mentioning that the individual must have non-negative net worth when he dies (that is have  $Z(t + 1) \geq 0$  because, by definition, a world of perfect credit markets is one in which the individual must be able to repay all his debts by the time he dies. Moreover, if the individual does not desire to leave inheritances to other person when he dies there is no reason for him to have a positive net worth (that is  $Z(t + 1) > 0$ ). Becker [34], to simplify the analysis assumed that the individual does not desire to leave

any inheritances and that he has  $Z(t + 1) = 0$ , using the fact that  $L(t) = 1 - H(t)$ .

Following Beckers assumption the equation (5.16) would be as follows:

$$(1+r) Z(0) + \sum_{t=0}^T (1+r)^{-t} W(t) = \sum_{t=0}^T (1+r)^{-t} [W(t)L(t) + P(t)C(t)] \quad (5.17)$$

where the left-hand side represents a “full-wealth” or “maximum” present value of the level of wealth attainable by the individual, since he devotes all available time each period to working (that is  $L(t) = 0$  for all  $t$ ) and to save and earn-interest on all his earnings in each period (that is  $C(t) = 0$  for all  $t$ ).

As illustrated, the similarity between the dynamic model’s full wealth and the static model’s full income ( $V + W$ ) is obvious; so is the similarity between the dynamic model’s expenditure stream  $\sum_{t=1}^T (1+r)^{-t} [W(t) L(t) + P(t) C(t)]$  and the static model’s expenditure  $WL + PC$ .

In both static and dynamic models analysis is concerned mainly with two points, the nature of equilibrium and displacement from equilibrium, either “comparative statics or comparative dynamics”.

Thus, while static equilibrium is concerned with the levels of  $C$  and  $L$  in response to given values of  $W$ ,  $P$  and  $V$  with the determinants of points of such marginal utility, dynamic

equilibrium is concerned with sets of levels of  $C$  and  $L$  in response to a net of values (time profiles) for  $W$ ,  $P$  and a value of initial net worth  $Z(0)$  with the determinants of points of such marginal utility movement over time. In other words comparative dynamics is concerned with low differences across individuals in initial net worth or in wage or price time profile which will lead to differences in time profiles for labour supply.

Having viewed these terms, then general dynamic model of labour supply fits fairly into the analytical framework presented in previous parts of this chapter. In large all measures that are convenient for static models remain useful in a dynamic context. For example, consider the comparative dynamic effect of an increase in  $Z(0)$ , provided consumption and leisure at all points in the life cycle are normal goods, both  $C(t)$  and  $L(t)$  will rise in response to the increase in  $Z(0)$  “an initial wealth effect”. Similarly, consider the comparative dynamics effect of a rise in leisure’s price  $W(t)$  at time  $t$ , coupled with a simultaneous adjustment in initial assets  $Z(0)$  that keeps lifetime utility  $U$  unchanged. Then  $L(t)$  will fall in response to this “income compensated” or “initial wealth-compensated” rise in its own price or own substitution effect.

By reviewing the family labour supply model (see Kaiksow [99]), one can consider the comparative dynamics effect of an income compensated (or initial wealth-compensated) rise in  $W(t)$  on leisure at time  $t' = L(t')$ , where  $t' \neq t$ . this is a cross-substitution effect, one that will be positive or negative depending on whether  $L(t)$  and  $L(t')$  are net substitutes or net complements. It is

obvious then that the cross-substitution effect on  $L(t)$  of a rise in  $W(t')$  will be equal to the cross-substitution effect on  $L(t')$  of a rise in  $W(t)$ : provided that is to replace 'husband' with  $(t)$  and 'wife' with  $(t')$ . The decision-making unit in the family labour supply static model is concerned with numerous persons, in the dynamic model it is concerned with numerous periods.

Despite the formal similarity between static and dynamic labour supply models, the later are more complex from an analytical standpoint, and potentially more useful and comprehensive from an empirical standpoint. For example, analysis of equilibrium in a static labour supply model yields little or nothing. In contrast, in the dynamic model, the analysis of equilibrium can yield a set of predictions about the equilibrium behaviour of labour supply over time.

Finally, according to this discussion, dynamic labour supply as function of participation rate is specified as:

$$P(t) = P(t) [Z(0), W(0), W(1), \dots, W(t), P(0), P(1), \dots, P(t)\bar{A}(0), \bar{A}(1), \dots, \bar{A}(t)]$$

where:

P: denotes the participation rate and  $\bar{A}$  denotes any other variables added to the model.

### 5.2.2 The Dynamic Equilibrium of Labour Supply Model

Dynamic equilibrium, the optimum in a dynamic labour supply model with exogenous wages as defined by Killingsworth [103] is

a set of equilibrium time profiles for labour supply and consumption determined for a given value of initial wealth  $Z(0)$ , and time profiles of wages  $W(t)$  and price  $P(t)$  for all period  $t$ .

To show how will equilibrium labour supply behave over the lifecycle, it is worth mentioning three factors or motives that affect the shape of the equilibrium labour supply profile. First and main factor is an efficiency effect that makes individual working more during periods when the wage (the opportunity cost of leisure) is highest. Second, the interest rate effect, the fact that the individual may invest his earnings at compound interest will induce him to work relatively much at first, bank his earnings and reduce his labour supply at advancing age. Third, on the other hand, time preference effect; that is in more formal term, the individual would prefer to enjoy leisure now rather than later, provided leisure is a normal good, this will induce him to work relatively little at first, meaning that labour supply will tend to rise as time passes.

The rate of change of labour supply over time due to the efficiency effect will be positive when the rate of change in the wage is positive and will be larger (smaller) in absolute value whenever the rate of change in the wage is larger (smaller) in absolute value.

The interest rate effect on labour is proportional to the negative of the rate of interest,  $-r$ , whereas the time preference effect on labour supply is proportional to the subjective rate of time preference  $p$ .

These two effects can be collapsed into a single time effect. Thus the rate of change of labour supply over time due to the time effect, that is the net result of  $p, r$  will be positive or negative depending on whether  $p - r$  is positive or negative.



Thus for example if  $p = r$  (offset each other), then  $H$  or labour supply and  $W$  will always move in the same direction over the lifecycle as the individual fulfills his equilibrium plan over time. On the other hand, if  $p < r$  then  $H$  (labour supply) and  $W$  may move in opposite directions for a part of the lifecycle. Suppose that both  $p < r$  and wage rises slowly later on. Then early in the lifecycle both wage and labour supply will rise, but later on labour supply will peak and then start to fall, whereas wages will go on increasing but at a slower rate.

Accordingly, earnings will also increase early in the lifecycle but will fall later on. Finally, the optimum in a dynamic model may entail a “corner solution” in which hours of work during one or more period will be zero. This means that hours of work will be zero at any moment in the lifecycle when the wage rate is sufficiently low, lower than the minimum wage level required to induce the individual to participate. Hours of work or labour supply will remain at zero even if the wage is rising rapidly as long as the wage level remains below the minimum.

### 5.2.3. Dynamic Equilibrium Function

To set up the dynamic equilibrium effects Weiss [171] assumed that the lifetime equilibrium does not involve any corners and suggested an ‘interior solution’ involving positive labour supply  $H(t)$  at all  $t$ . Accordingly, lifecycle is to be treated as a continuous sequence of infinite small instants and the individual’s lifetime utility  $U$  as:

$$U = \int_0^T e^{-\rho t} u[C(t), L(t)] dt \quad (5.18)$$

where:

$u$ : is the instantaneous utility function.

$C(t)$ : is the consumption of goods at time  $t$ .

$L(t)$ : is the leisure of time  $t$ .

$\rho$ : is the individual's subjective rate of time preference.

That is the present value of the individual's lifetime utility  $U$  as the 'sum' (integral) of utilities  $u$  received at each distinct instant in the lifecycle from  $t = 0$  to  $t = T$ .

The instantaneous utility function  $u(t)$  is assumed to be well behaved. This means that the marginal utility of consumption of goods and leisure at any moment  $t$  is positive but diminishes with the amount of  $C(t)$  and  $L(t)$  that is:

$$u_C(t) > 0, u_L(t) > 0, u_{CC}(t) < 0, u_{LL}(t) < 0$$

Thus, at any moment  $t$ , indifference curves showing the combinations of  $C(t)$  and  $L(t)$  that yield the same instantaneous utility  $U(t)$  so that:

$$\Delta t = u_{CC}(t) u_{LL}(t) - u_{CL}(t) u_{LC}(t) > 0 \quad (5.19)$$

In order to simplify Killingsworth [103] assumed "for a moment" that the lifecycle consisted of only one period and that the

individual were forced to pick  $C(t)$  and  $L(t)$  so to maximize single period utility  $u(t)$  (rather than lifetime utility  $U$ ) subject to the conventional constraint:

$$P(t) C(t) = W(t) H(t) + V(t) \quad (5.20)$$

where:

$V(t)$ : is the amount of income received by the individual during period  $t$ .

Thus income effect on  $C(t)$  or  $L(t)$  as a change in  $V(t)$  is:

$$Y_{CV}(t) = -[u_C(t) u_{LL}(t) - u_L(t) u_{CL}(t)] / \Delta(t) \quad (5.21)$$

$$Y_{LV}(t) = -[u_L(t) u_{CC}(t) - u_C(t) u_{LC}(t)] / \Delta(t) \quad (5.22)$$

where:

$Y_{CV}(t)$ : is the income effect of a change in  $V(t)$  on consumer goods.

$Y_{LV}(t)$ : is the income effect of a change in  $V(t)$  on leisure.

Also the substitution effect on  $C(t)$  and  $L(t)$  of a change in its price  $CP(t)$ ,  $W(t)$  is:

$$S_{CP}(t) = u_C(t) u_{LL}(t) / \Delta(t) \quad (5.23)$$

$$S_{LW}(t) = u_L(t) u_{CC}(t) / \Delta(t) \quad (5.24)$$

where:

$S_{CP}(t)$ : is the substitution effect of a change in price on consumer goods.

$S_{LW}(t)$ : is the substitution effect of a change in wage on leisure.

Then the efficiency effect and time effect that affect the dynamic equilibrium can be obtained as Weiss [171] stated:

$$\dot{H}(t) = -S_{LW}(t) [\dot{W}(t) / W(t)] + Y_{LV}(t) (p - r) \quad (5.25)$$

where:

$\dot{H}(t)$ : is the change of hours of work (labour supply) over time.

And the first term on the right-hand side of the above equation is the efficiency effect, the second term is the time effect.

It is more appropriate to imply an efficiency effect and a time effect in the equilibrium dynamics, while refer to the same as substitution effect and income (wealth) effect in a comparative dynamics.

### 5.3 Comparative Dynamics

The comparative dynamics properties of dynamic labour supply models depend on the relative magnitudes of dynamic income (or wealth) own substitution, and cross substitution effects. The magnitudes and the directions of these effects depend crucially on the extent to which changes in exogenous variables (e.g. wage rate) in a given period  $t$  are anticipated, also these effects depend on whether the individual is at a “corner” (unemployed) or not during part of the lifecycle. If so then changes in the wage profile need not have any effect on labour supply during periods when the wage rate is well below the reservation or the minimum level, although such changes may have effects on labour supply during other periods. To illustrate the effect of unanticipated increase in income (or net wealth), suppose that the individual suddenly learns at time 0 that at time  $t^* > 0$  he will receive a previously unexpected lump sum transfer payment  $\Lambda$ . The present value of this payment is  $(1 + r)^{-t^*} \Lambda$ , so its impact on consumption and leisure at all dates will be identical to its effect if it is paid at time 0. But if the individual already knows at time 0 that he will receive that payment at  $t^*$  nothing will have happened because the individual already formulated his lifecycle optimization strategy according to his previous knowledge, there is no element of surprise.

Next, consider the effect of an increase in the wage of the individual at time  $t$   $W(t)$  on both, labour supply at the same time  $H(t)$  and labour supply at other dates  $H(t')$  where  $t' \neq t$ . If the individual knows about this ‘increase’ at time 0, this knowledge will already have been built into the plan at time 0, for supplying at time  $t$ ,  $t'$  and every other time. This kind of wage increase is fully anticipated and does not cause labour supply at time  $t$  or any other times. On the other hand, if the increase in wage comes as a complete surprise to the individual, there will be both

income and substitution effects on labour supply at time  $t$  and all future periods.

The income effect leads to reduction in labour supply, because the increase in the wage raises the individual's income (or wealth). On the other hand, the wage increase makes leisure at time  $t$  more expensive (worker sells leisure to employer) and makes leisure at other dates  $t' \neq t$  relatively less expensive than the individual thought would be at time 0, when he formulated his lifecycle plan. This will raise labour supply and reduce leisure time at time  $t$ , due to an own substitution effect and will raise labour supply and reduce leisure at other time  $t' \neq t$  due to a cross substitution effect depending on whether leisure at  $t'$  is a net substitute or a net complement for leisure at time  $t$ .

Finally the comparative dynamics refers not only to shifts of labour supply in profiles that facing a given individual but also to differences in profiles facing different individuals. To illustrate, suppose individual A faces a wage profile that is uniformly higher than the wage profile facing individual B. Then the difference between the labour supply of A and B at any date  $t$  may be decomposed into the following:

- I      A positive own-substitution effect arising from the fact the A's wage at  $t$  is higher than B's wage.
- II     A cross-substitution effect, arising from the fact that A's wages at all time  $t' \neq t$  are higher than B's which will be positive (negative) if leisure times at different dates are complements (substitutes).
- III    An income (wealth) effect, arising from the fact that A's full income exceeds B's, which will be negative on labour supply, provided leisure is a normal good.

If A's wages are higher than B's by the same proportion at all time one can say (by the composite commodity theorem) that composite leisure will be lower and therefore lifetime earning will be higher for A than for B.

#### 5.4 Unemployment and Employment Function

From a theoretical point of view the stock of unemployment in an economy at a particular moment in time is defined as

$$\bar{U}_t = L_t - \bar{E}_t \quad (5.26)$$

Where:

$\bar{U}_t$  = numbers unemployed

$L_t$  = total labour force

$\bar{E}_t$  = number employed.

In percentage terms:

$$\bar{U}_t / L_t = (1 - \bar{E}_t / L_t) 100 = \bar{U}_t \quad (5.27)$$

$$\bar{U}_t = \bar{U}_t / 1 - \bar{E}_t \quad (5.28)$$

When we measure the stock of unemployment we are seeking a measure of the degree of underutilization of labour in the economy. However, this measure of utilization is only accurate if we assume the unemployed are wholly unemployed and the employed are fully utilized. Bornstein [38]

has drawn attention to this problem when comparing unemployment in capitalist market economies like Britain and socialist centrally planned economies like former USSR. Generally unemployment or 'disguised' employment occurs when workers have jobs but are underutilized, for example part-time. Such underutilization of employed labour does not only occur in socialist and capitalist economies. Economists have emphasised its incidence in developing economies.

In Bahrain economy, underemployment can be considered in two categories. Firstly, workers can simply be required to work fewer hours than they are able or willing to work. Secondly, production per unit of labour time can be lower than is possible given the capital stock available.



## **CHAPTER SIX**

### **Labour Supply Model**

#### **6.1 Introduction**

The aggregate labour supply function is a cornerstone of both neoclassical theory and short-run keynesian-type employment theory. In the long-run, it is generally assumed that the supply of labour from any fixed population is an inelastic function of the real wage rate. In the short-run, on the other hand, it is commonly assumed that the labour supply is infinitely elastic at some rigid real or money wage rate. Researchers have found it necessary to proceed on the basis of certain widely accepted assumptions. The purpose of this chapter is firstly to estimate the labour supply mainly as a function of real wage and identifying the elasticity in which dynamic and comparative dynamics assumptions could be examined on annual time series of labour force in the state of Bahrain covering the period 1971-1994. Secondly to test the two hypotheses relative wage and permanent wage that is adopted in some research i.e. Wachter [169] and finally to test discouraged and added-workers effect of unemployment. Use is made of cross-section data and published estimates issued by The Central Statistics Organisation and the Ministry of Finance and National Economy.

Because of sensitivity of some age-groups of labour force to variations in unemployment and wage rate, it may be fruitful to regard the working population as consisting of only two categories: (1) the primary workers; those who are more permanently attached to the reported labour force (prime-age males); and (2) those who, are in the reported labour force only when employed and tend to drop out of it when not employed (secondary workers). The participation rate of the primary workers would

be expected to be approximately constant at a high level and that of the secondary workers to be considerably smaller and more variable.

The model is applied to Bahraini males secondary workers: 15-19 age and 65 and over and all females. It is also applied to primary workers; Bahraini males and non-Bahraini males and females, for the period 1971-1994.

The labour supply model is constructed in the following equation:

$$\log L / P_t = B_0 + B_1 W^* + B_2 W / W^* + B_3 P / P^* + B_4 U + E$$

Where

$L$  is the labour force employed and unemployed people of each group.

$P_t$  is the working population 15 years and over of each group.

$L / P_t$  : Labour force participation rate of each group at time  $t$ , which is defined as the ratio of employed and unemployed who seek jobs by the working population 15 years and over of that group.

These groups are defined as follows:

$TL / P$  : Labour force participation of total working population, Bahraini and non-Bahraini.

$ML / P$  : Labour force participation of working males population, Bahraini and non-Bahraini.

- $FL / P$  : Labour force participation of females working population, Bahraini and non-Bahraini.
- $TL / PB$  : Labour force participation of total Bahraini working population.
- $ML / PB$  : Labour force participation of Bahraini males working population.
- $FL / PB$  : Labour force participation of Bahraini females working population (secondary workers).
- $L / P_{15-19}$  : Labour force participation rate of Bahraini working population 15-19 age group (secondary workers).
- $L / P_{65+}$  : Labour force participation of Bahraini working population 65 age group and over (secondary workers).
- $TNL / P$  : Labour force participation of total non-Bahraini working population.
- $MNL / P$  : Labour force participation of males non-Bahraini working population.
- $FNL / P$  : Labour force participation of non-Bahraini females working population.

$W^*$  is the average permanent real wage.

$W$  is the average current wage.

$W/W^*$  is a proxy for “relative wage or income”.

$P$  is the actual consumer price.

$P^*$  is the perceived price.

$P/P^*$  is the inflation (money illusion).

$U$  is the aggregate unemployment rate.

$E$  is the error term.

In this model where all variables are in logarithmic form, suppliers of labour as reacting primary to four variables; an anticipated ‘normal’ or permanent real wage; a relative income or a relative wage; a money illusion, the deviation of the actual price from its perceived price; and aggregate unemployment rate.

## 6.2 Definition of Variables

The variable wage  $W$  is represented by average monthly earnings excluding over-time in the private sector. The decision to use earnings data and not compensation is based on the notion that pecuniary benefits may not be relevant or at least as relevant as current wage employee can expect to receive if employed.

Permanent Wage ( $W^*$ ):

The permanent wage theory is used to estimate the shape of the traditional labour supply curve of the various groups or the underlying work-leisure trade-off. The permanent real wage ( $W^*$ ) is a distributed lag variable of current and past values of  $W$ . It is built directly into the variable after best result is obtained when wage ( $W$ ) is lagged by one year.

In the dynamic labour supply function, current wage may not yield meaningful results. Instead, it is essential to analyse labour supply by decomposing the observed current wage  $W(t)$  into two components  $W(t)$  and  $W^*$ . Such that labour supply does respond to permanent wage  $W^*$  but does not respond to current wage  $W$ . Permanent wage reflects earnings prospects in lifetime while a current wage does not.

Relative Wage or Income ( $W/W^*$ ):

$W/W^*$  variable is a proxy for relative wage or relative income that is today's standard of living in relation to the past standard. The relative income theory has been explored by W Kaiksow [94] when labour supply model was applied to Bahraini females. It showed that the greater the income, the lower the rate of labour force participation of females. The direct effect of the variable  $W/W^*$  as a relative standard of living on labour supply may be illustrated when past wages are high relative to present wages, all secondary workers, especially wives may tempt to sacrifice their leisure and enter the labour market to supplement their family's income.

The Inflation or Money Illusion Variable ( $P/P^*$ ):

In the labour supply model, labour force participation rate is viewed as a function of the real wage, to the extent that perceived prices  $P^*$ , (which is a distributed lag variable of current and past values of  $P$ ) are not equal to actual prices ( $P$ ). The perceived price level as well as the real wage could be a determinant of the labour supply. For example, whereas workers contracts are in money wages, workers may tend to evaluate money wages by deflating by price level.

The influence of money illusion or the inflation variable, however, may be represented as the excess demand for goods, so it may act as an indicator for excess demand for labour.

Unemployment Rate or Labour Market Variable ( $U$ ):

The unemployment rate variable is measured by the ratio of unemployed to the labour force those who are unemployed and looking for employment plus employed. The model implies that labour supply partially depends on labour market conditions or labour demand, so potential entrants to labour market and hence to labour force may respond to job opportunities. In this model discouraged and added workers hypothesis is tested.

The results showed that the greater the unemployment rate, the smaller the actual labour supply among secondary workers in relation to the equilibrium of full-employment labour supply, at the prevailing real wage  $W^*$ . For a person to be included in labour supply at the real wage  $W^*$ , the work-leisure trade-off must indicate that the cost of leisure (foregone) at most equals the benefits of working. When unemployment exists (disequilibrium) a new costs element is introduced which is dependent on the probability of not finding a job and includes both the pecuniary costs of the job search and the psychic costs if turned down. Since this new cost is included in the individual's decision process, an increase in unemployment will make the cost of a job outweigh the potential reward for those on the borderline (secondary workers) of labour force participation. On the other hand, conversely, that a rising level of unemployment brings additional of those secondary workers into the labour market to support their unemployed family's members.

### 6.3 Procedure of Estimation

In this study the labour supply as a function of four explanatory variables is estimated by a multiple regression equation for the period 1971-1994. Ordinary least squares technique is used to estimate the regression equations. All the variables (real wage, relative wage (income), inflation rate and unemployment rate) are transformed into logarithmic form in order to improve the estimation. The following points must be taken into consideration for the purpose of estimating the equation:

Firstly, for the estimation purpose, some assumptions must be made concerning the dynamic features of the model. In particular permanent real wage  $W^*$  and perceived price  $P^*$  are to be replaced with observable series. Consequently, these variables are measured as distributed lags of present and past values of the observable wage and price series. This consists of building lags directly into the equations to obtain the long-run coefficients. It is found that lagging by one year is the most convenient (i.e. best model).

Secondly, account must be taken of the fact that errors in the current unemployment rate may be correlated with errors in the labour force participation rate, so that the coefficient of the unemployment rate is biased toward larger negative values. Since the labour supply may be adjusted with a lag to the unemployment rate, this lag effect can be taken into account and so the possible bias is reduced, by replacing the unemployment rate with a distributed lag series of current and past values. It is found that a lag of one year unemployment is the best result obtained. In order to explore and improve the estimation a dummy variable is introduced taking into account the values of unemployment rate between the period 1984 to 1994. The results did not show any significant changes. (It is therefore omitted from the equation). It is possible that the relation between the labour force participation and unemployment

depends mainly on: firstly, the probability of secondary workers finding a job may decrease in a discontinuous manner with increase in unemployment. An explanation of this, is that at high levels of unemployment and, especially at very high levels (chronical) the probability of secondary workers being hired falls significantly. Secondly, the search costs rise discontinuously with the unemployment rate so that a worker who is willing to work at the prevailing real wage may only become discouraged and leaves the labour force after he is likely to have devoted some time to his job search.

Finally, although the essential requirements to reduce the errors correlation has been taken into account upon building the main structure of the model, obtaining a best model for each group required additional statistical techniques. In this regard and in order to get the best estimation stepwise on exogenous and lag on both endogenous and exogenous techniques are computed taking into account the following important and sensitive points: firstly, in this thesis labour supply behaviour of each group is measured as a function of main observable pecuniary variables on the basis of neoclassical economic theory; work-leisure trade off. Secondly, theory of permanent wage is tested. The permanent and relative wage hypotheses suggest different signs for the magnitude  $B_2 - B_1$  in the equation, so it is possible to test their importance. It is expected that both theories are operating.

The best models with their results are presented in Appendix I. Analysis of the results in detail are following the introduction of the permanent wage theory.



## 6.4 The Results

### Introduction of the Permanent Wage Theory

In this chapter the purpose of the wage variable is to estimate the shape of labour supply curve of the various groups or the underlying work-leisure trade-off (as described in the previous chapter).

The response of the labour force to changes in wages is composed of two components: a substitution and an income effects. The substitution effect is positive since an increase in the real wage (with income is constant) increase the opportunity cost of leisure time (in this case leisure is an expensive good) thus encouraging individuals to enter the labour force. The income effect is negative since an increase in wage (thus income) provides workers with the opportunity of increasing both their consumption of goods and leisure. A positive income effect would indicate that the increase in wage is low and that leisure is an inferior good.

The supply curve of labour as depicted in Figure 6, combines the substitution and income effects and therefore be either positive or negative sloped depending on whether the income effect of a wage increase is smaller or larger than the substitution effect. If the substitution effect dominates at low wage level and then is outweighed by the income effect the labour supply curve will be negatively sloped. During optimum lifetime in equilibrium dynamic model, hours of work in one or more period will be zero (corner solution detailed in previous chapter). This means, when labour supply curve is strongly negative, the wage rate is sufficiently lower than the minimum permanent wage ( $W < W^*$ ) required to induce the individual to participate in labour supply. Accordingly even when the wage is rising rapidly, participation will

## Labour Supply Curve and Permanent Wage Theory

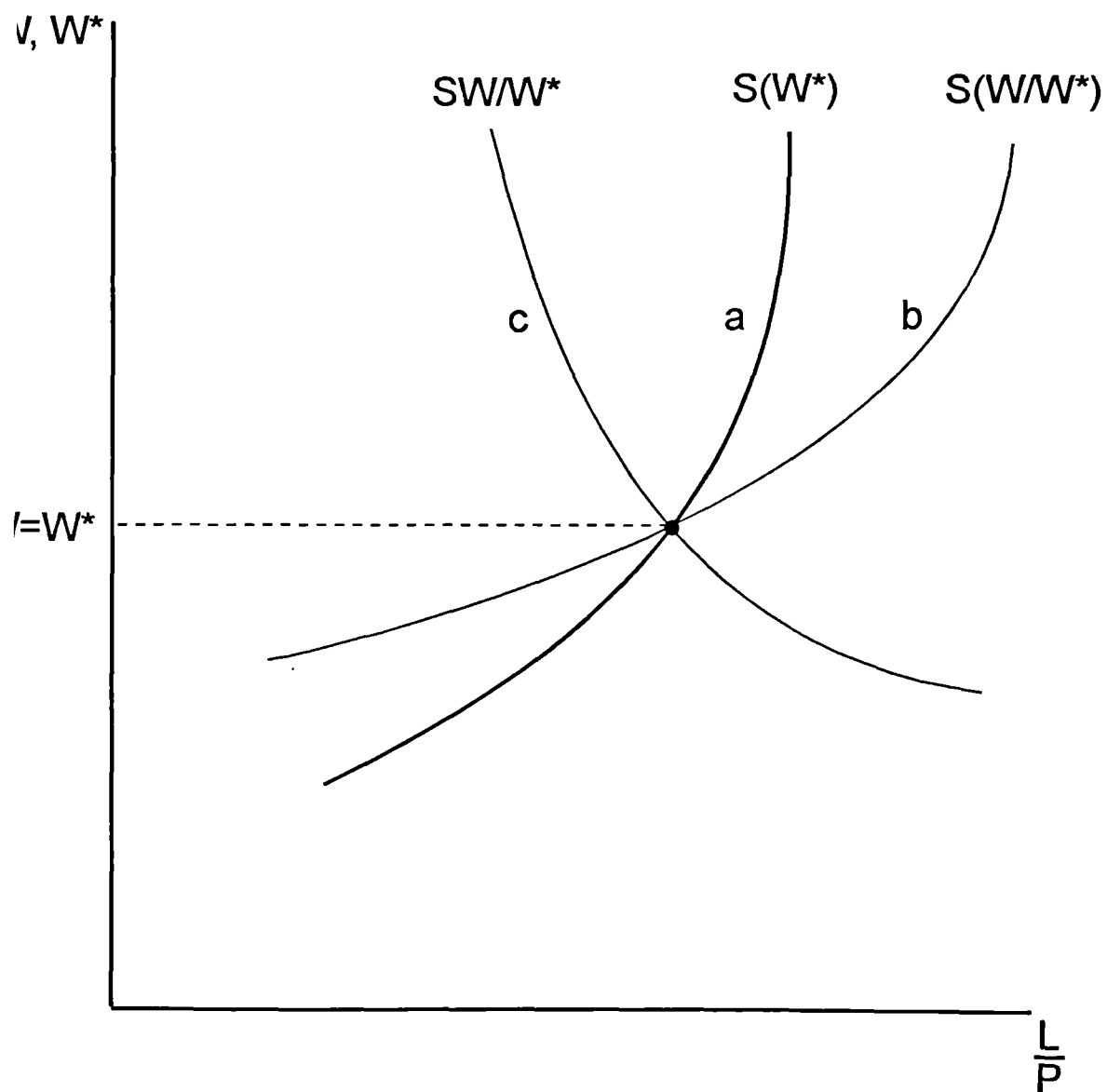


Figure 6

remain at zero so long as the wage is not “efficient”. It is a main factor in equilibrium lifecycle (efficiency effect is detailed in the previous chapter) that shapes labour supply profile.

Since the supply curve is an equilibrium concept, its argument is a permanent wage variable ( $W^*$ ) where its parameter assumed to be positive. A change in this permanent wage mean displacement from equilibrium. The disequilibrium transitory wage effect is represented in  $W / W^*$  where  $W$  is the real current wage. This transitory effect can be identified with the substitution effect since it relates to the response of the labour force to a change in the current wage ( $W$ ) with a constant permanent wage ( $W^*$ ). The basic hypothesis which is represented in the efficiency effect theory, is that workers time their labour market with period when the current wage ( $W$ ) is high relative to the permanent  $W^*$ . If we assume that  $W^*$  is fixed in the short-run, thus an increase in  $W$  to point (b) in Figure 6 with  $W^*$  constant causes a movement upward in short-run labour supply curve. In otherwords increase in  $W^*$ . This displacement from equilibrium (comparative dynamics detailed in the previous chapter) or increase in  $W^*$  so that  $W^* = W$  causes declines in the labour supply to its equilibrium (a). A new  $S(W / W^*)$  then intersects  $S(W^*)$  at (a) with slope again  $B_2 > B_1$  when another wage increase occurs.

In addition to the indirect effects of the variable  $W / W^*$  which introduces the substitution effect as previously mentioned. It may also have direct effects on labour force participation as well. For example when current standards of living are above those expected on the basis of past experience that is  $W > W^*$ . Secondary workers choose leisure or producing more children.

Having introduced the permanent wage theory, now labour supply equation in logarithmic form of each of the underlying groups as follows:

### **1 - Total Labour Supply Model**

Total labour force participation model showed a positive serial correlation when first fitted by ordinary least squares method. Then stepwise and differences techniques were applied to the model. A lag of four times and exclusion of inflation variable produced the best fitted model for the change of labour supply. In Figure 6.1 the normal probability plots of residual across the regression line ensured normality and chart of the residuals reveals that the series is smooth across the zero axis.

The results of least squares fitting of the equation are as follows:

$$\begin{array}{rcccc}
 TL/P & = & 0.977 & - & 0.183W^* & - & 0.0042W/W^* & + & 0.0460 U \\
 \text{dif 4 lags} & & (10.42) & & (9.34) & & (2.92) & & (2.98)
 \end{array}$$

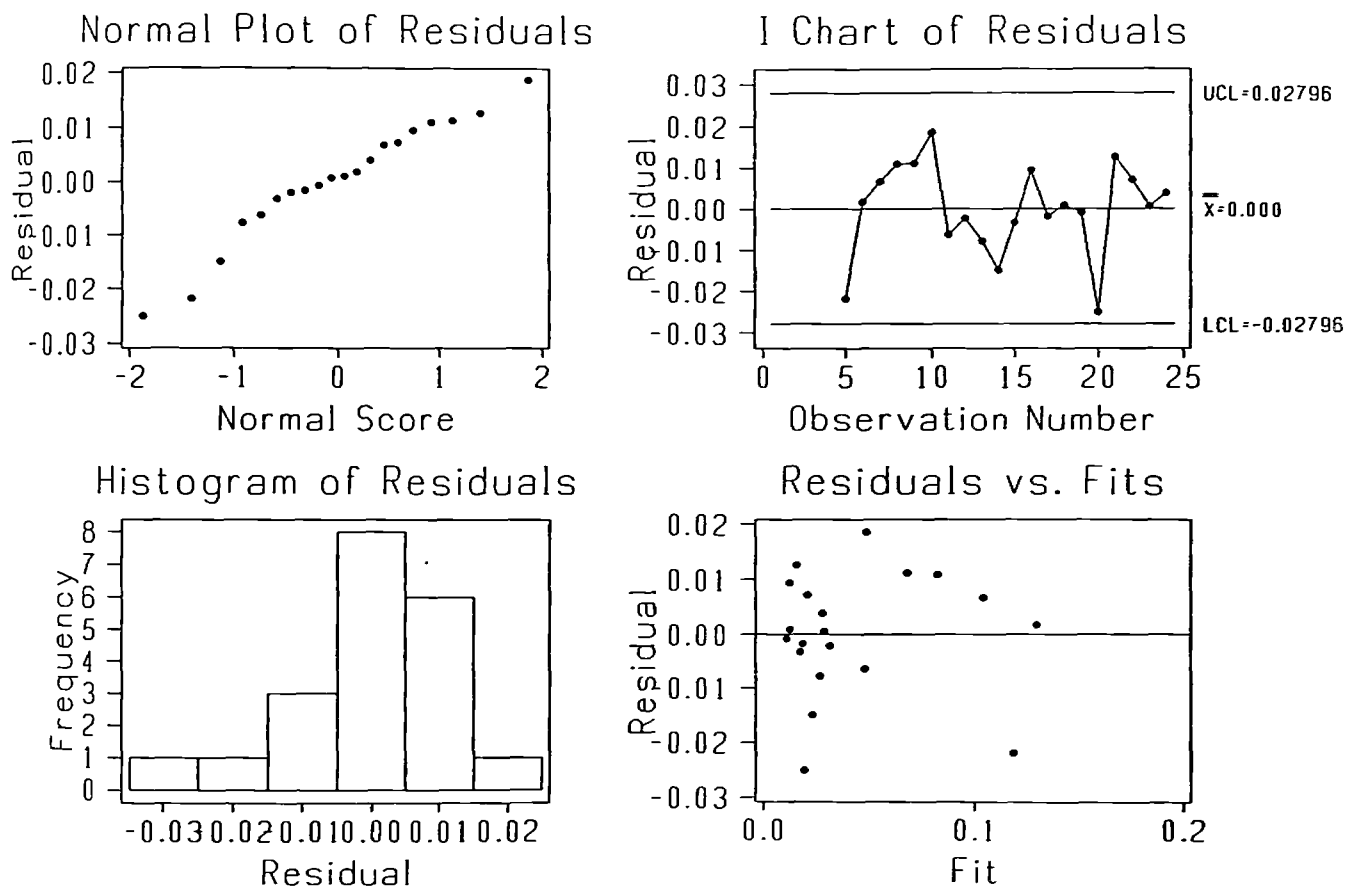
$$R\text{-sq} = 90.6\% \qquad F = 51.40 \qquad DW = 1.81$$

(*t*-values are given within parenthesis)

*D-W*, Durbin and Watson statistic, test for serial correlation indicates no positive autocorrelation at 5% level of significance.

*R-sq* is the multiple correlation coefficient. *F*-statistic is used to test hypothesis involving multiple parameters.

# Total Labour Supply



**Figure 6.1**

The model indicates a very good fit to the participation function. It almost explained 90 percent of the variation in the labour supply behaviour in Bahraini labour market.  $F$  distribution is highly significant at 5% level of significance.

The coefficient estimate of the permanent wage variable is negative and highly significant and indicates that a change of participation with respect to wage change is inelastic. It is -0.18. This is consistent with the general assumption of long-run labour supply. Also, this finding highly supports the “efficiency effect” theory that mentioned in the previous chapter. This result showed how well the efficiency effect dominates during equilibrium labour market which takes four periods of time to clear.

Also transitory labour supply wage to disequilibrium is inelastic. It is -0.004. So the relative wage or income is negative. Its coefficient is greater than the permanent wage coefficient  $B_2 > B_1$  but both permanent and relative wage are negative. In other words a change of real wage prevailing in the labour market remains lower than acceptable over four periods of lifecycle. (This supports permanent wage theory). Some labour is supplied at disequilibrium wage which is higher than market clearing wage as it is shown in Figure 6.2

In this case change on labour supply curve is constant at (a) efficient equilibrium wage as depicted in Figure 6.2. During four periods of lifetime, participation of some individuals of this group in one or more periods will be zero. The permanent wage rate is relatively lower than required to induce more suppliers to participate in the labour market. Labour supply will remain at zero for some individuals as long as the wage is ineffective. The most probable reason is an increase of natural unemployment due to fractional unemployment resulting from a very slow clearing process in the labour market.

## Labour Supply Curve of Total Labour Force

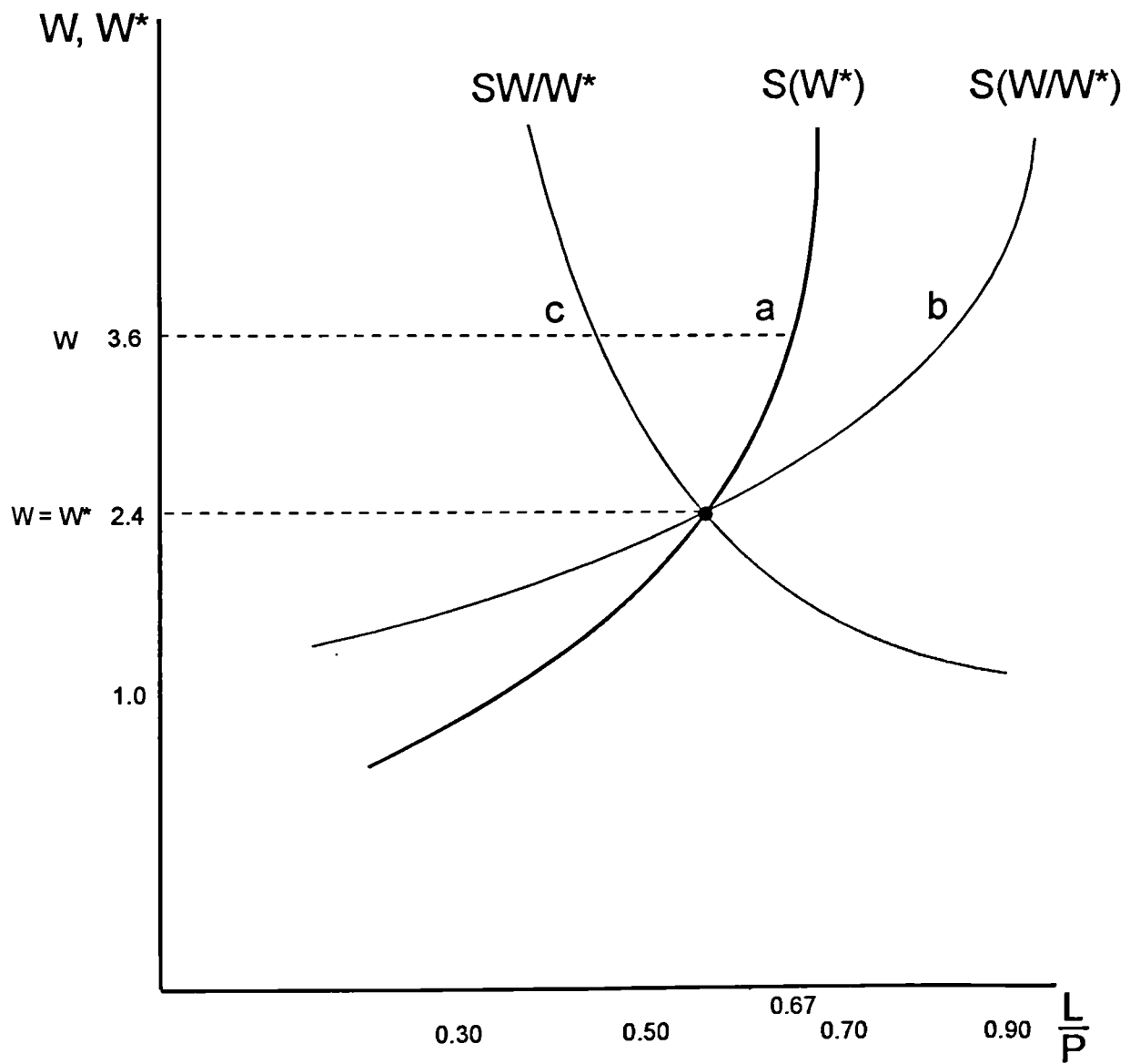


Figure 6.2

Unemployment rate coefficient shows a statistically significant positive sign on change of labour supply over four periods of lifecycle. This means that either added workers effect dominates over the four periods of lifetime or it is outweighed by this effect following the discouraged worker effect over one or more period. Because this model includes both Bahraini and non-Bahrainis in competitive labour market, so its equilibrium treats unequal equally. The outcome is high unemployment rate particularly among Bahrainis who believe that permanent wage is unfairly established in the inefficient labour market, which clears very slowly each four periods of lifecycle. In conclusion of this model is that a significant increase of unemployment rate due to inefficient wage, associated with structural unemployment due to slow clearing process exists in Bahrain's economy together with excess in labour supply that restores clearing wage at a low level. Prices are also low besides a deficiency of demand that makes market force mechanism in terms of price and wage inefficiently operates in a slump economy with unemployment stock significantly increases.



## 2 - Total Male Labour Supply Model

Total male labour supply model upon fitting the least squares method showed a negative serial correlation. To solve this problem and obtain unbiased estimate of change of the independent variables;  $W^*$ ,  $W/W^*$ ,  $U$  and inflation  $P/P^*$  on the change of labour supplied by this group, a sum of three periods of time has produced the required best model. In Figure 6.3 plot and histogram of the residuals clearly confirm the normality of errors and chart of residuals shows a smooth fitting while volatile fluctuations are eliminated.

Results of the model are as follows:

$$\begin{aligned} ML/P &= 0.948 + 0.0639W^* - 0.0102W/W^* \\ \text{Add 3 lags} &\quad (11.22) \quad (7.43) \quad (3.24) \\ &+ 0.00149U + 0.113P/P^* \\ &\quad (0.18) \quad (2.26) \end{aligned}$$

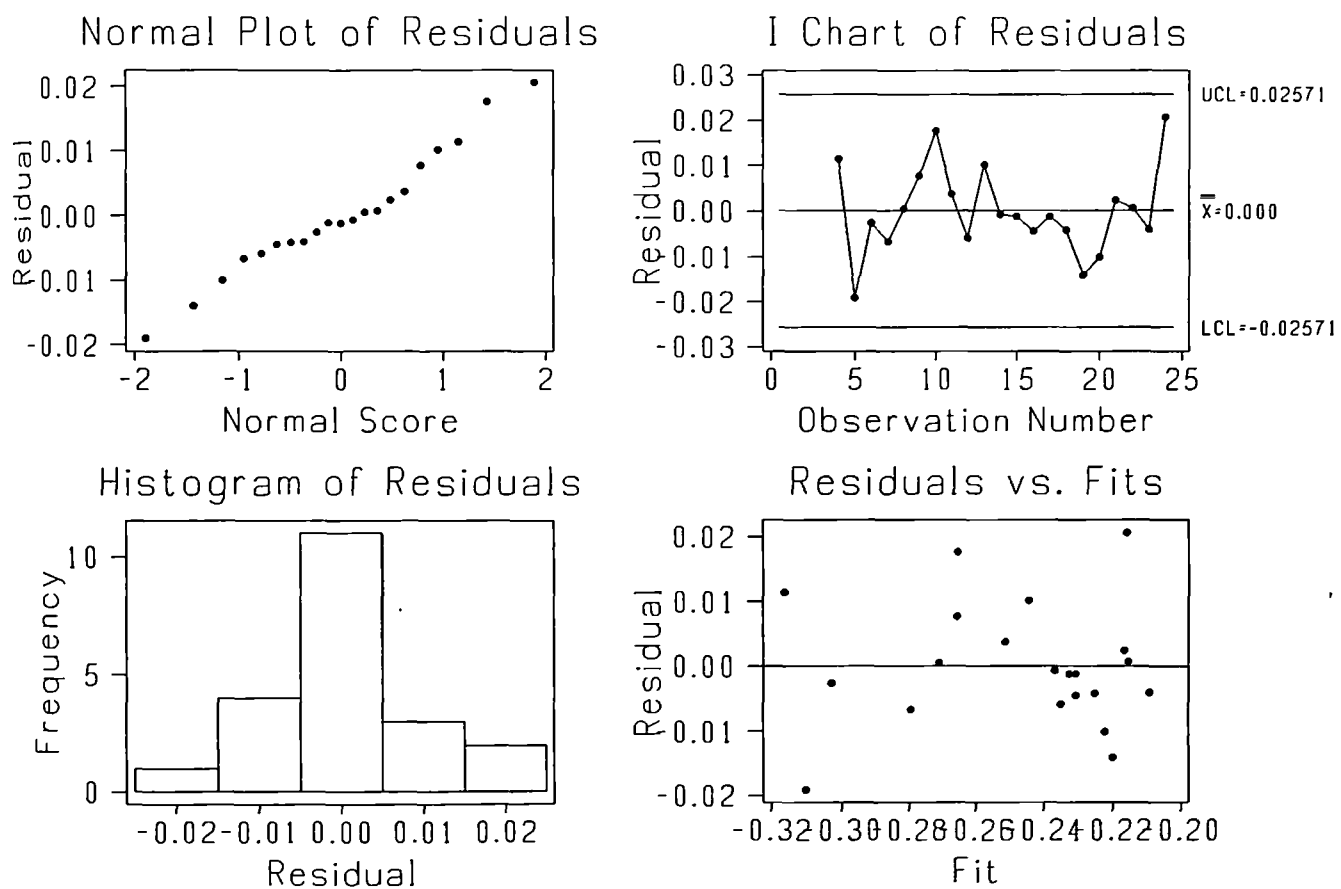
$$R\text{-sq} = 92\% \quad F = 45.96 \quad DW = 1.63$$

( $t$ -values are given within parenthesis)

There is no autocorrelation.

The model indicates a very good fit for total male, it explained 92% of the variation of labour at a high statistical significant level supplied by total male (primary workers).

## Total Male Labour Supply



**Figure 6.3**

The coefficient of the permanent wage  $W^*$  is positive and significant it is 0.06. The transitory wage is negative, it is -0.012. These indicate that a change of labour supply with respect to change of wage is rather inelastic. A change in wage showed significantly the substitution effect on the change of labour supply through disequilibrium labour market. The relative wage or income coefficient  $W/W^*$  is negative. It showed the income effect on a change of labour supply. When males have relatively better income than the wage rate prevailing through disequilibrium labour market they choose leisure. It is more expensive than hours of work. Since  $B_2 < B_1$ , this supports relative wage hypotheses. Change on labour supply curve of this group is constant at disequilibrium wage which is higher than permanent or market clearing wage.

The coefficient of unemployment although is not significant it is outweighed by the additional worker effect over three periods of lifetime. For primary workers, such findings seem normal as these groups are responsible for their families. Accordingly an increase in the unemployment rate does not prevent them from participation in the labour market. Generally, there is an excess of labour supplied by this group with involuntary unemployment due in particular to inefficient wage.

The coefficient of the inflation variable significantly indicates a positive response to participation over three periods of lifetime. However, this variable may represent an excess demand for labour as a result of excess demand for goods.

### 3 - Total Female Labour Supply Model

Total female labour supply model for Bahrainis and non-Bahrainis showed a positive serial correlation when first is fitted by O.L.S. method. To solve this problem on the basis of the proceeded criteria, particularly bias and variance, the change of female labour supply is best obtained when data are lagged by three periods of time. In Figure 6.4, the plot of the residuals across the regression line is almost normal and the fluctuations are smoothed in the differenced data.

Results of the model are as follows:

$$\begin{array}{rcccc} FL/P & = & 3.639 & - & 0.696W^* & - & 0.499W/W^* & + & 0.237U \\ \text{diff 3 lags} & & (7.12) & & (-6.52) & & (-1.03) & & (2.64) \end{array}$$

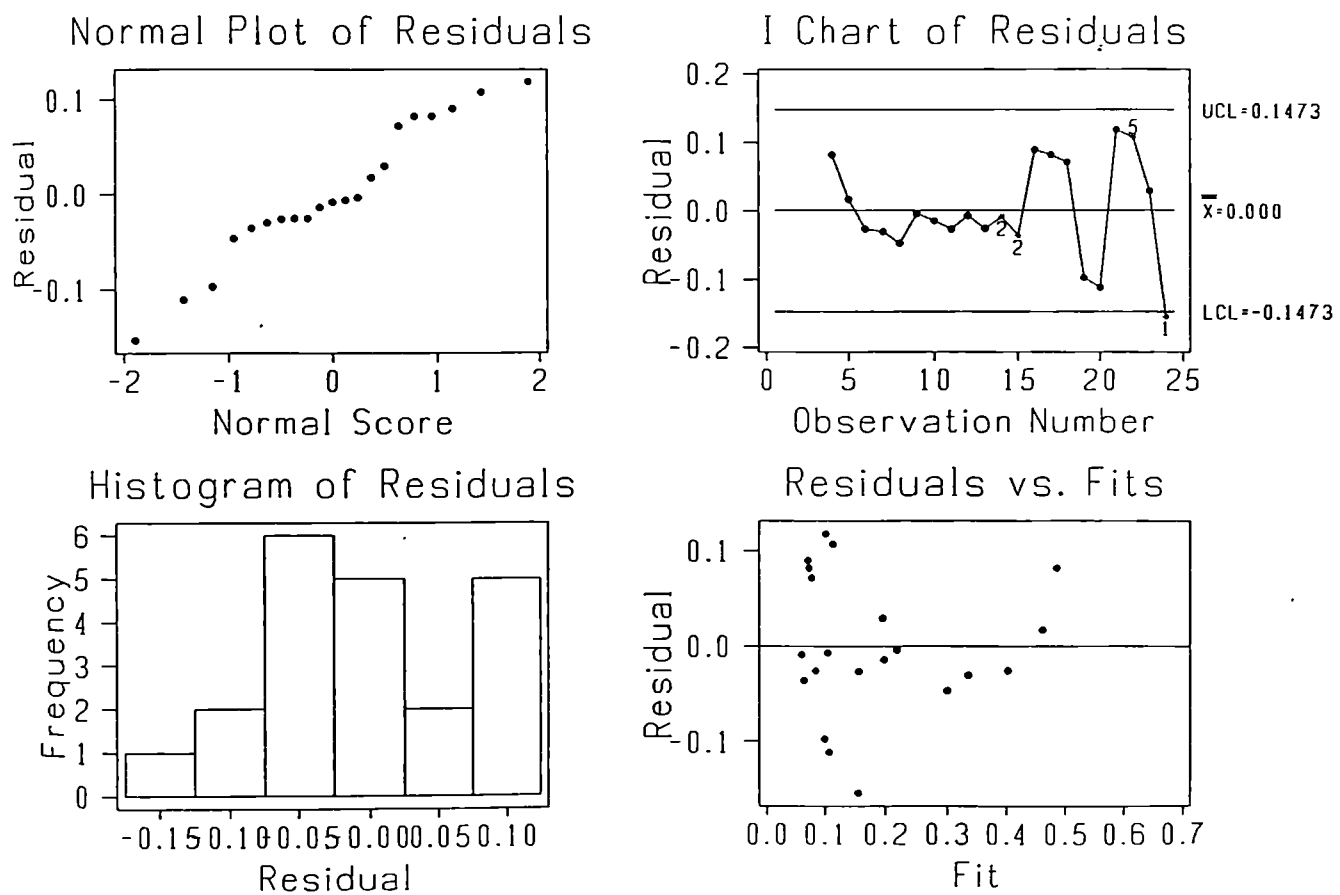
$$R\text{-sq} = 77.4\% \quad F = 19.44 \quad DW = 1.40$$

(*t*-values are given within parenthesis)

There is no autocorrelation at 1% level of significance.

Females participation model showed a good fit,  $R^2$  is 77.4% and is highly statistically significant. The coefficient estimate of the permanent wage variable is negative but significant. It indicates that an efficiency effect on labour supply dominates over three periods of lifecycle. The change of females participation to change in wage is inelastic. It is -0.69. This inelasticity of change on labour supply to wage indicates the dominance of efficiency effect during disequilibrium labour market among females which takes three periods of lifetime to clear through 1971-1994.

## Female Labour Supply



**Figure 6.4**

The change of the labour participation to changes in relative wage or income  $W / W^*$  showed an income effect, but is not statistically significant. Its coefficient is greater than permanent wage coefficient  $B_2 > B_1$ . The real wage prevailing in the labour market is lower than acceptable over three periods of lifetime. (This support permanent wage hypothesis). The relative income  $W / W^*$  variable may also have direct effect as current standards of living to the past standards, that is  $W > W^*$ . In this case females (secondary workers) choose leisure or stay home and produce more children. Change on labour supply curve of females is strongly backward sloped due to inefficient wages.

Conversely, unemployment rate coefficient significantly indicates a positive sign. An increase in unemployment rate induces more wives to enter the labour market to offset their unemployed husband, or to keep up to their standard of living. This strongly supports the explanation of inefficiency of wage and the existence of involuntary unemployment in loose labour market due to deficiency of demand.

#### 4 - Total Bahraini Labour Supply Model

Total Bahraini labour supply model showed a first order autocorrelation when first is fitted by ordinary least squares method. Then difference and lags technique were applied. The best model obtained for a change on labour supply by change of these exogenous variables is a lag of one period of time. In Figure 6.5, the plot of the residuals of the differenced data across the regression line is normal. Also the chart of residuals illustrates a non correlated series across the zero axis except the irregular long-run fluctuations.

Results of the model are as follows:

$$\begin{array}{ccccccc} TL/PB & = & 0.00199 & + & 0.160W^* & + & 0.0517W/W^* & - & 0.0036U \\ \text{diff 1 lag} & & (0.41) & & (2.82) & & (3.54) & & (2.11) \end{array}$$

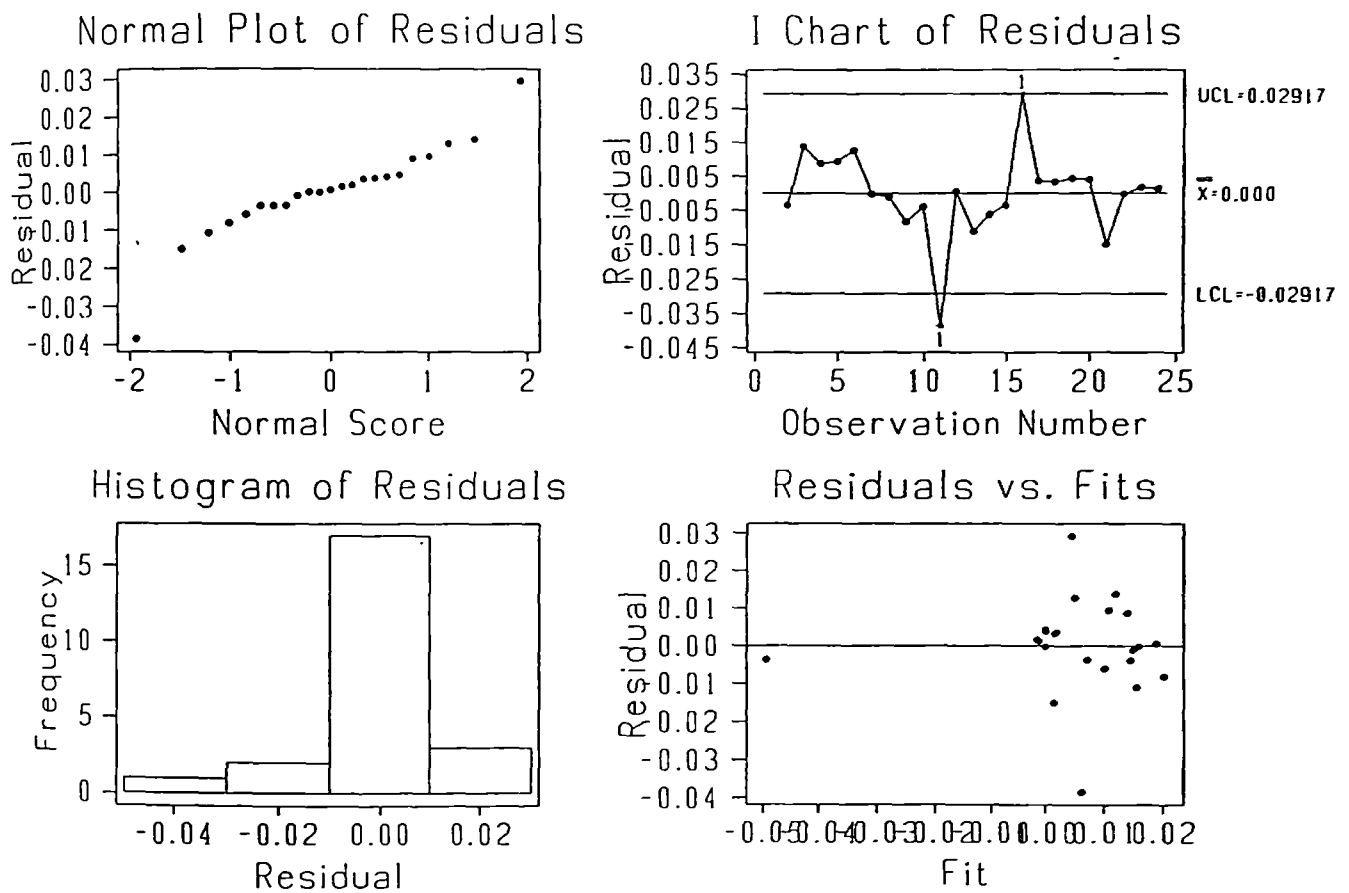
$$R\text{-sq} = 55\% \quad F = 7.75 \quad DW = 1.70$$

(*t*-values are given within parenthesis)

According to Durbin-Watson statistic test, there is no autocorrelation at 5% level of significance.

In this integrated Bahraini labour force participation (primary and secondary workers), the model explains 55 percent of the variation in their behaviour as a function of the permanent wage, relative income and unemployment rate explanatory variables. The coefficient of the wage variable is significantly positive. The coefficient of relative wage or income presented by  $W / W^*$  is also significant. The coefficient of wage is greater than the coefficient of relative wage or relative income  $B_2 < B_1$  this support the relative wage hypothesis. Elasticity of change on

## Bahrainis Labour Supply Model



**Figure 6.5**



participation with respect to change in wage is 0.16. The substitution effect of change on wage induces individual to substitute leisure by work over disequilibrium labour market. Change on labour supply curve of Bahraini workers is strongly sloped upward at (b) as depicted in Figure 6.6. Unemployment coefficient showed a discouraged-worker effect. It is significant. In this case, search cost, particularly psychological cost is rather high to Bahrainis. This means that Bahraini workers respond partially to job opportunities. This finding supports aggregate demand policy. Based on the discouraged worker theory maintaining that a stimuli to aggregate demand not only would provide more employment opportunities but would absorb the labour force of workers who earlier had either left the labour force when jobs became scarce or who were prevented from entering it at all (labour reserve). As a result of the existence of these workers, Government's effort to reduce the increase of unemployment rate via market clearing device would be hard. The reason is clearly illustrated in Figure 6.6, any unemployment along a to b due to deficiency of demand is involuntary associated with natural unemployment (equilibrium) resulting from an inefficient wage. Although transitory labour supply elasticity is positive; 0.05 but clearly is very low. It indicates clearly the existence of disequilibrium unemployment character among Bahrainis labour force together with excess labour supply.

## Labour Supply Curve of Total Bahraini

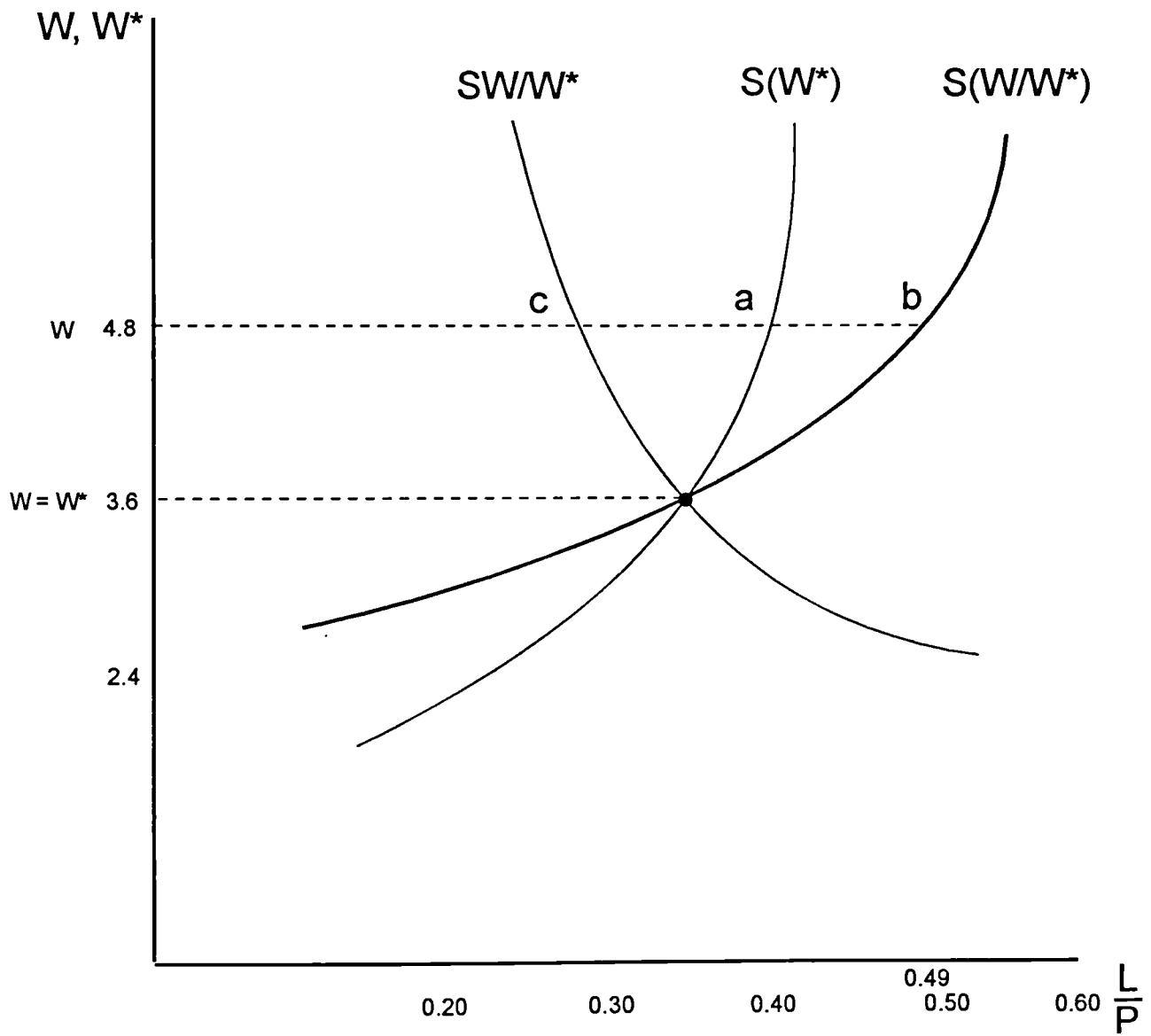


Figure 6.6

## 5 - Male Bahraini Labour Supply Model

Male Bahraini labour supply model showed a first order autocorrelation when first is fitted by O.L.S. method. Similar to the model of total Bahraini suppliers, the change of male labour supply in response to changes on permanent wage, relative income and unemployment rate is best obtained where these variables are lagged by one period of time. Also stepwise technique produced a good fit when inflation variable is excluded. Figure 6.7, similar to 6.6. In Figure 6.7, the differenced series is almost normal across the regression line and is smoothed out of the fluctuations.

Results of the model are as follows:

$$\begin{array}{ccccccc} ML/PB = & 0.00162 & + & 0.0725W^* & + & 0.0656W/W^* & + & 0.0072U \\ \text{diff 1 lag} & (-0.48) & & (1.82) & & (6.41) & & (0.32) \end{array}$$

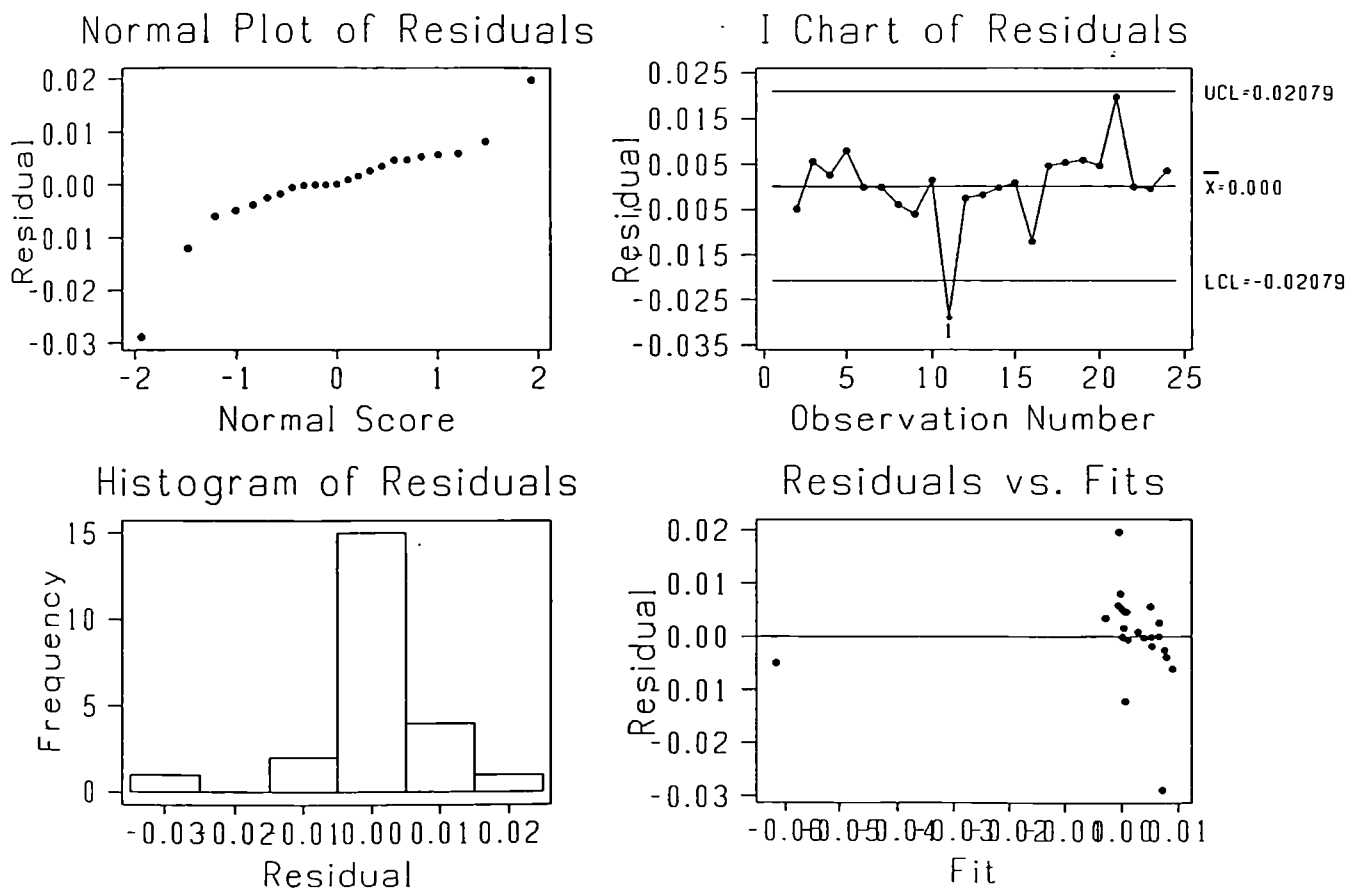
$$R\text{-sq} = 71.8\% \quad F = 16.09 \quad DW = 1.79$$

(*t*-values are given within parenthesis)

There is no autocorrelation at 5% level of significance based on Durbin-Watson test statistic. The model significantly indicates a good fit for Bahraini primary workers.

The model explained almost 72% of the variation on male labour supply behaviour in response to change on permanent wage, relative wage and unemployment rate. In this model the substitution effect of change on relative or transitory wage ( $W / W^*$ ) has significantly predominated. Its parameter is smaller than the permanent wage ( $W^*$ ) parameter,  $B_2 < B_1$ ,

## Bahrainis Males Labour Supply



**Figure 6.7**

this supports relative wage theory. Elasticity of change on participation for Bahraini males with respect to wage change is 7%, it is greater than the elasticity of total males model.

Change on labour supply curve of Bahraini males through disequilibrium labour market is strongly sloped upward. The substitution effect dominates at a current wage prevailing in the market, which is higher than permanent wage. To interpret this phenomenon with respect to comparative dynamics properties. Individual response to change on labour supply depends on the relative magnitude of his income or wealth, own substitution (income or wealth of time  $t$ ) and cross-substitution (income or wealth of  $t'$  where  $t' = t - 1$ ) effects. The magnitude of this effect depends on the extent to which changes in his wage in this two periods of time are anticipated, also depend on whether the individual is employed or unemployed during this two periods of his lifetime. Accordingly, the increasing labour supply of Bahraini primary workers is caused by either, individual gets an unanticipated increase in his permanent wage, or he was unemployed.

Unemployment rate variable's coefficient shows an added-worker effect. Conversely to the discouraged worker effect. Additional worker hypothesis asserts that rising levels of unemployment bring additional workers into the labour market.

However, the model for this group is similar to total Bahrainis labour force, both are characterised by excess labour supply.

## **6 - Model of Secondary Workers Bahrainis Males 15-19 Age Group Labour Supply**

In the secondary workers males 15-19 age group model, dummy time variable is included in the equation, in order to resolve correlation. As we proceeded on the other models, stepwise and differences lag techniques is applied. The best model was obtained when both labour supply and the explanatory variables are differenced four times. Similarly to total and male groups in Figure 6.6 and 6.7. In Figure 6.8, the residuals of the differenced series seems almost normal across the regression line and the fluctuations are smoothed out.

Results of the model are as follows:

$$\begin{array}{cccccc} L/P_{15-19} = & 0.274 & - 0.765W^* & + 0.158 W/W^* & + 0.778U & - 0.408T \\ \text{diff 4 lag} & (1.96) & (-2.40) & (0.94) & (1.88) & (-3.77) \end{array}$$

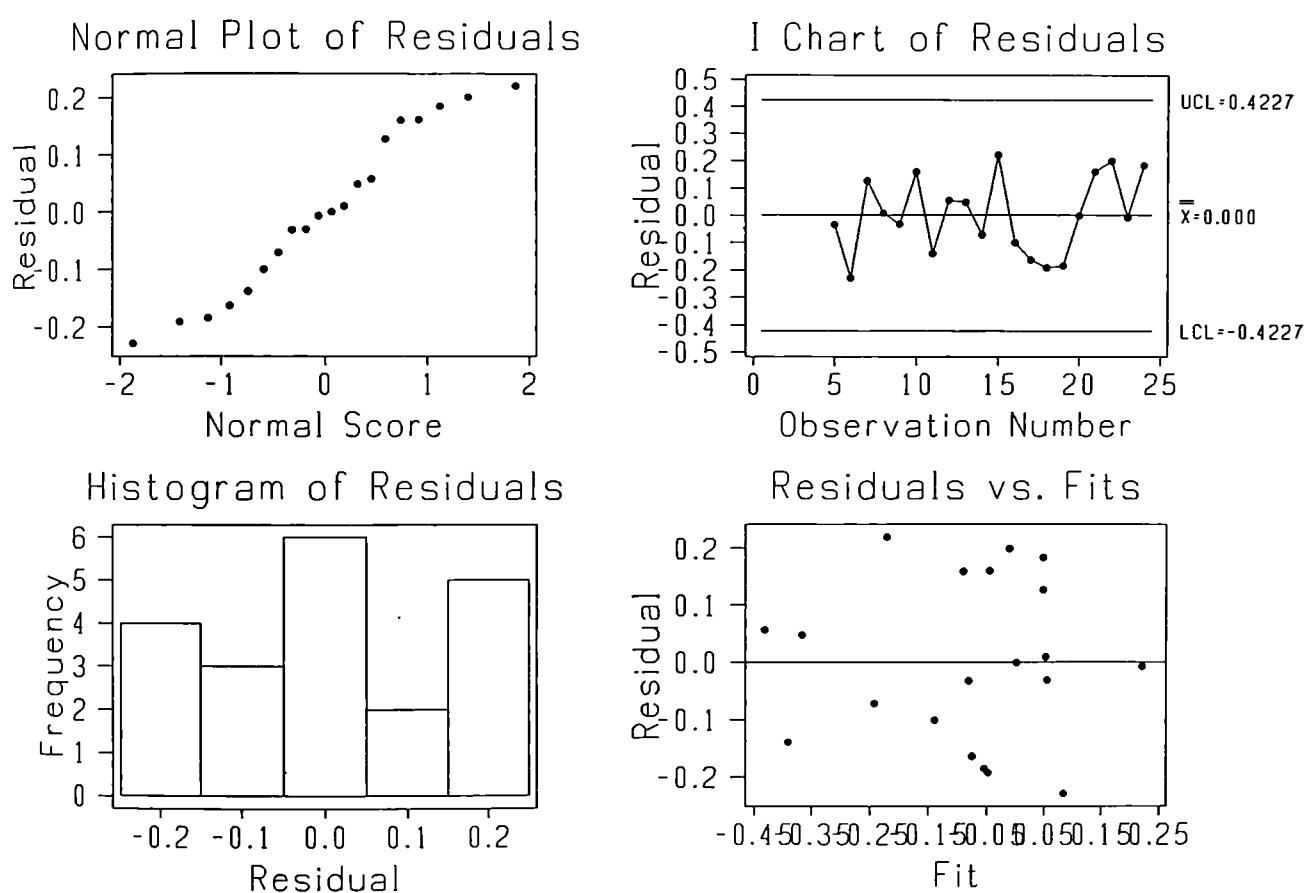
$$R\text{-sq} = 59.1\% \quad F = 5.43 \quad DW = 1.81$$

(*t*-values are given within parenthesis)

There is no autocorrelation at 5% level of significance.

The model explained 59% of the variation on the participation of this group. The coefficient of wage although negative is highly significant. The response to change of participation with respect to wage change for this group is inelastic (-0.76).

## Male Bahraini Labour Supply age group 15-19



**Figure 6.8**

This result represents a very strong support for the “efficiency effect” theory. The relative wage or income coefficient is positive, but is not significant  $B_2 > B_1$ . This result support permanent wage theory.

Although relative wage coefficient shows a substitution effect on change of participation, the change on wage rate prevailing in the labour market is lower than anticipated which prevents age group 15-19 males from entering labour force during equilibrium employment of four periods of lifetime. This finding supports “labour reserve” theory. For this group the substitution effect insignificantly operates at low wage level over disequilibrium of lifetime. Transitory labour supply elasticity of this group although very low; 0.15, it is greater than Bahrainis primary workers. It is quite evident that these 15-19 age group suffers of high and long duration of natural unemployment over equilibrium labour market due to low employment opportunities which could be converted into structural unemployment.

The unemployment variable coefficient indicates a positive attitude towards participation in the labour force. An added worker effect is outweighed over four periods of lifetime.

Time effect of this group on changes of participation is a highly significantly negative: that is in more formal terms, the individual of this group would prefer to enjoy leisure at this period of lifetime rather than later, this will induce him to work relatively little at first, devoting more time for schooling, meaning that labour supply will tend to rise as time passes.

Generally, the findings of this model of secondary worker is reasonably good and accurate in the absence of schooling effect. The findings are consistent with the neoclassical based theory work-leisure trade-off. On the other hand the results reveal excess labour supplied by this group associated with increase of unemployment which is a character of slump



## **7 - Model of Labour Supply of Secondary Workers Bahrainis Males Age Group 65 and Over**

The model of secondary workers males age group 65 and over showed a positive serial correlation when first fitted by O.L.S. method. In order to solve this problem differences and stepwise techniques were applied. Time variable also is included in the model. The best mode produced is when labour supply is differenced four lags. In Figure 6.9, the most smoothed series is illustrated. The plot of the residuals across the regression is almost normal.

Results of the model are as follows:

$$\begin{array}{rcl}
 L/P_{65+} & = & 31.9 + 0.647W^* + 0.262W/W^* \\
 \text{diff 4 lag} & & (2.48) \quad (2.57) \quad (0.45) \\
 & & + 0.269U - 0.395P/P^* - 7.60T \\
 & & (0.96) \quad (-0.74) \quad (-2.48)
 \end{array}$$

$$R\text{-sq} = 65\% \quad F = 5.20 \quad DW = 1.74$$

(*t*-values are given within parenthesis)

According to Durbin-Watson test statistic, there is no autocorrelation at 5% level of significance.

The model explained 65 percent of the variation on participation of this group.

# Male Bahraini Labour Supply age group 65+

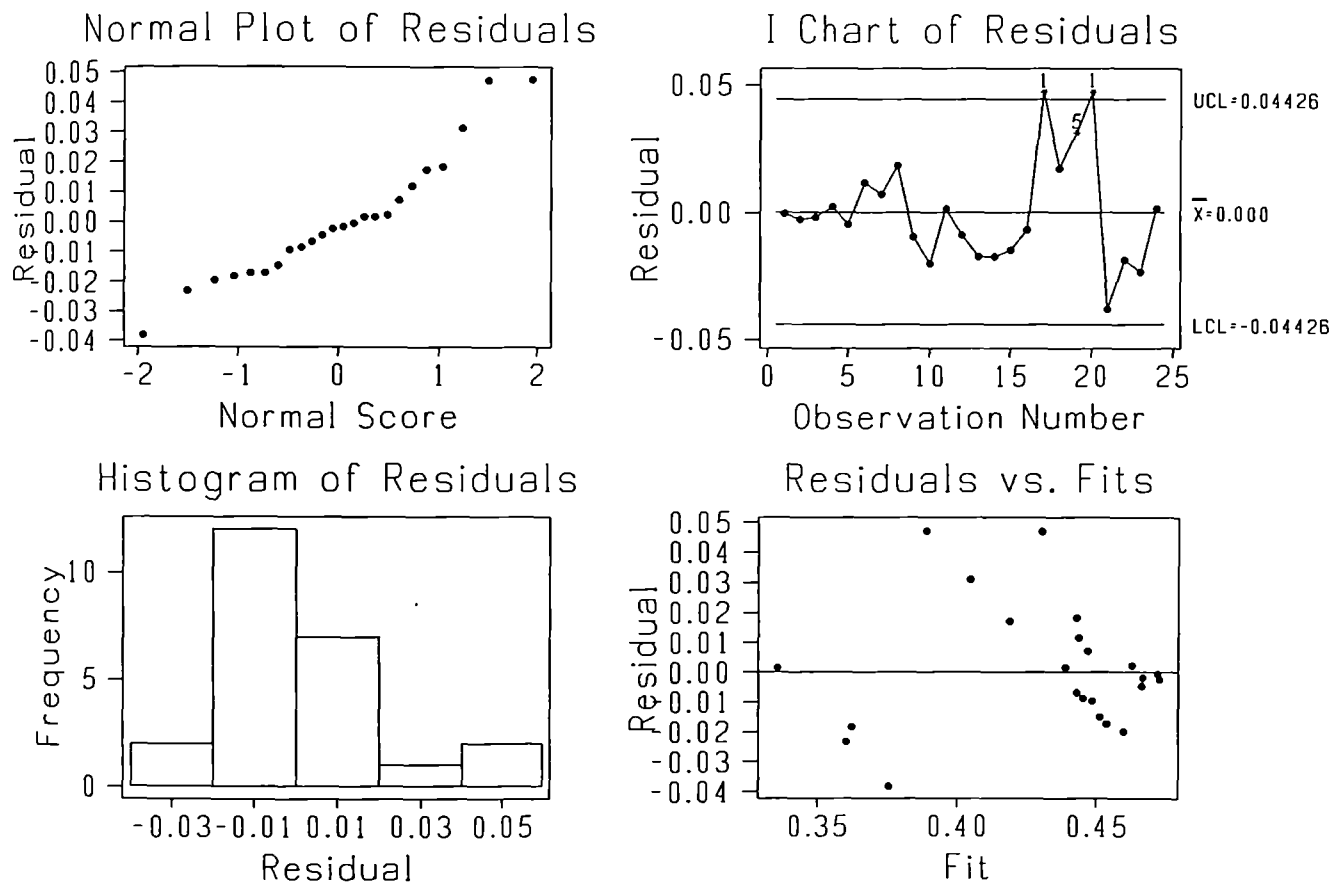


Figure 6.9

The permanent wage variable  $W^*$  indicates significantly a substitution effect on change of participation in the labour force. The relative income  $W/W^*$  is also positive but is not significant. The response of change on participation of this group with respect to wage change is rather inelastic (0.65) over part of four periods of lifetime. Change on labour supply curve is sloped upward. This support the importance of relative wage hypothesis. Individuals of this group participate in the labour market to increase their opportunities for both more consumer goods and leisure time.

Unemployment rate coefficient indicates also an added-worker effect, but is not significant. On the otherhand, inflation variable coefficient indicates a negative sign but is not significant. If this variable represents demand side for labour then it decreases their opportunities to participate in the labour market.

Time effect on the change of labour supply on this group is negatively significant, that is in normal terms, following the peak of labour supply, the later starts to fall, whereas wages may be increasing but at a slower rate. However, the results reveal excess labour supplied by this group associated with increase of unemployed inflation rate effect is negative which confirms a deficiency of demand for labour of this group.

## 8 - Bahraini Females Labour Supply Model (Secondary Workers)

The method of O.L.S. were used to fit the model. In order to solve a positive serial correlation problem, differences and stepwise techniques were applied.  $T$  time variable is also included. In Figure 6.10, the results do not seem different than the previous group in Figure 6.9. Both groups are secondary workers and are influenced by the same irregular long-run fluctuations. In Figure 6.10, the residuals are smooth in the differenced series.

Results of the model are as follows:

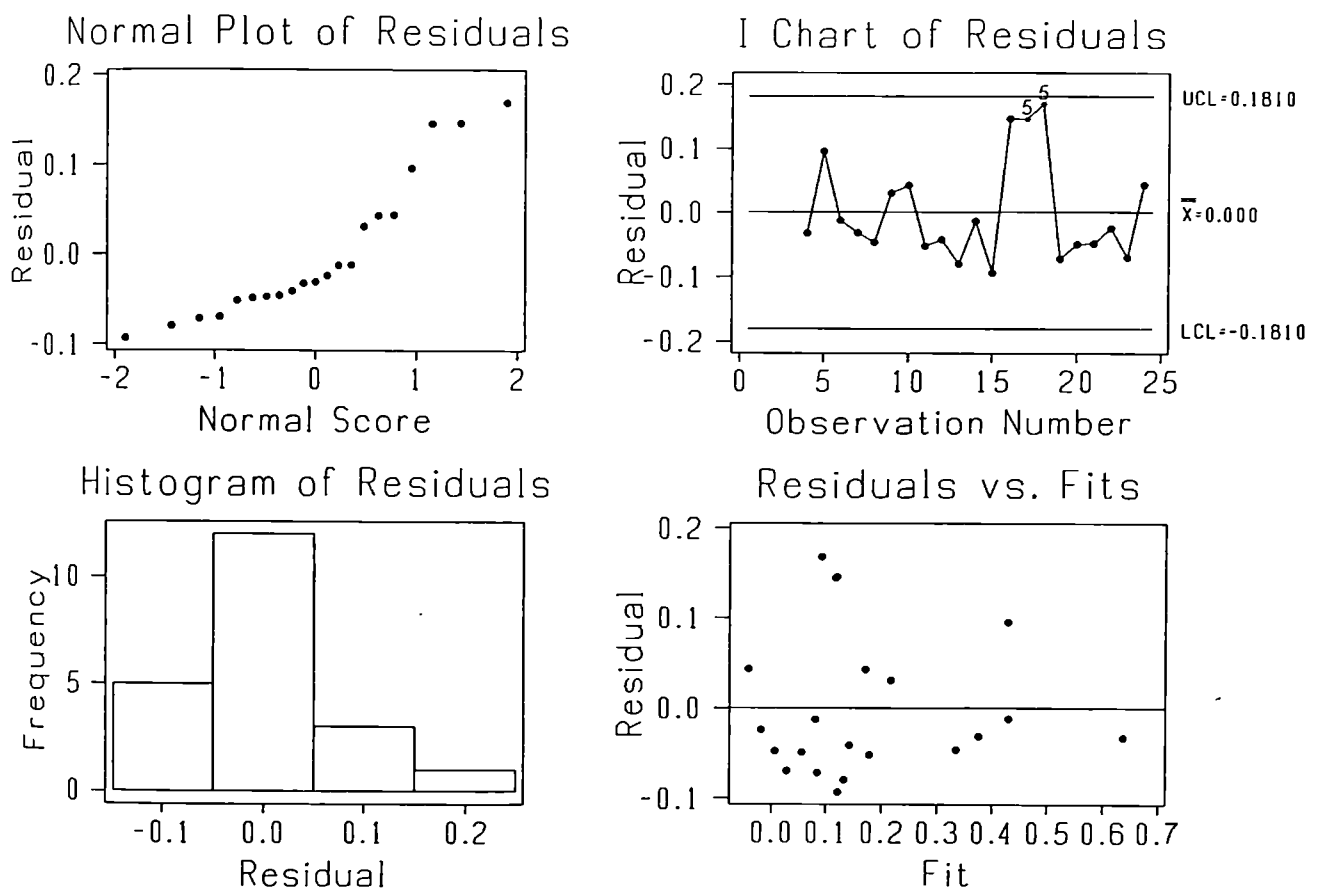
$$\begin{array}{cccccc} FL/PB & = & 20.515 & - & 0.707W^* & - & 0.110 W/W^* & + & 0.277U & - & 4.28T \\ \text{diff 3 lag} & & (5.22) & & (-2.57) & & (-0.92) & & (1.00) & & (-5.17) \end{array}$$

$$R\text{-sq} = 82.8\% \quad F = 19.27 \quad DW = 1.52$$

( $t$ -values are given within parenthesis)

There is no autocorrelation. The model for this group explained about 83 percent of the variation on labour supply. The coefficient estimate of permanent ( $W^*$ ) wage variable significantly indicates a negative sign. The change on participation with respect to wage change is inelastic (-0.71). The relative wage or income coefficient  $W/W^*$  is also negative, but is not significant. The income effect of wage change has predominated on labour supply change over three periods of lifetime. Change on Labour supply curve of this group is negatively sloped backward.

# Female Bahraini Labour Supply



**Figure 6.10**

This means change on wage rate is sufficiently lower than required to induce female to enter labour market equilibrium. Consequently, secondary workers choose leisure or producing more children. The findings support the importance of an efficient permanent wage for this group.

Time effect on change of participation also supports the theory of efficiency with respect to wage. The parameter is significantly negative. Also unemployment rate change indicates added-workers but is not significant. It is an evidence that employment equilibrium of this group is very low.

However, the results of this model clearly reveal that although transitory labour supply with respect to wage change is inelastic, which is a character of involuntary unemployment, there is a tendency towards a constant excess labour supplied by Bahrainis females.

## 9 - Total Non-Bahraini Labour Supply Model

The model is well fitted by ordinary least squares. Although stepwise and lag techniques are applied to the model in order to explore the data, including the main four variables is well representing labour supply of total non-Bahraini as illustrated in Figure 6.11. The plot and the histogram of the residuals are almost normal. The chart of the residuals reveals a smooth series across the zero axis.

Results of the model are as follows:

$$\begin{aligned}TNL/P &= -0.734 + 0.106W^* + 0.0695W/W^* \\ &\quad (-11.22) \quad (7.95) \quad (1.50) \\ &\quad + 0.0141U + 0.0893P/P^* \\ &\quad (1.70) \quad (2.09)\end{aligned}$$

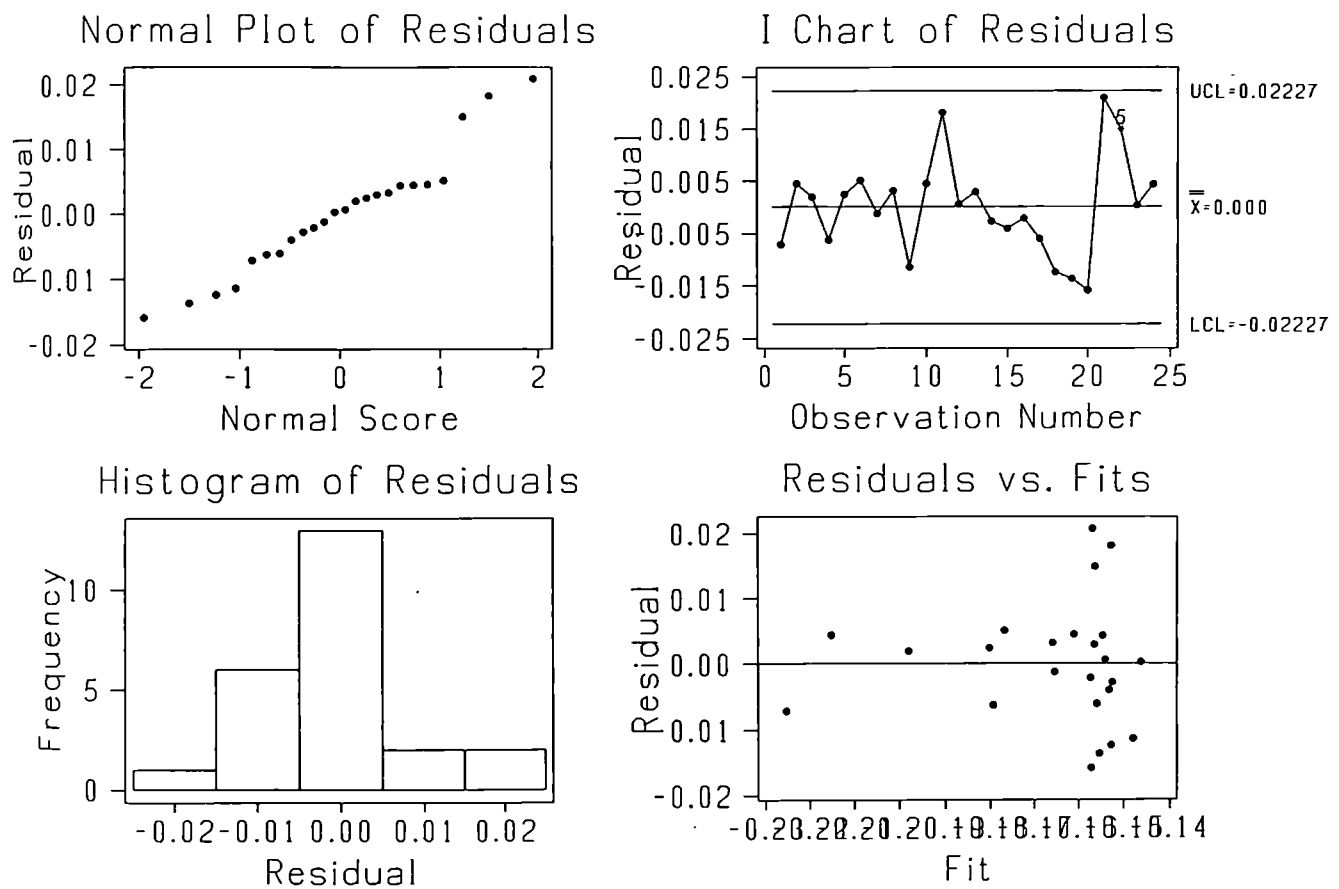
$$R\text{-sq} = 83.2\% \quad F = 23.56 \quad DW = 1.53$$

(*t*-values are given within parenthesis)

There is no autocorrelation. The coefficient of determination is highly significant, it explained 83 percent of the variation on labour supply of this group.

The coefficients of the variables are as expected all in a positive sign apart from the constant parameter. The elasticity of labour supply with respect to wage is (0.106). Change on relative wage shows a substitution effect on labour supply. The curve is strongly positive upward on (b) as depicted in Figure 6.12.  $B_2 < B_1$ , this supports the relative wage hypothesis.

## Non Bahraini Labour Supply



**Figure 6.11**



# Labour Supply Curve of Total Non-Bahraini

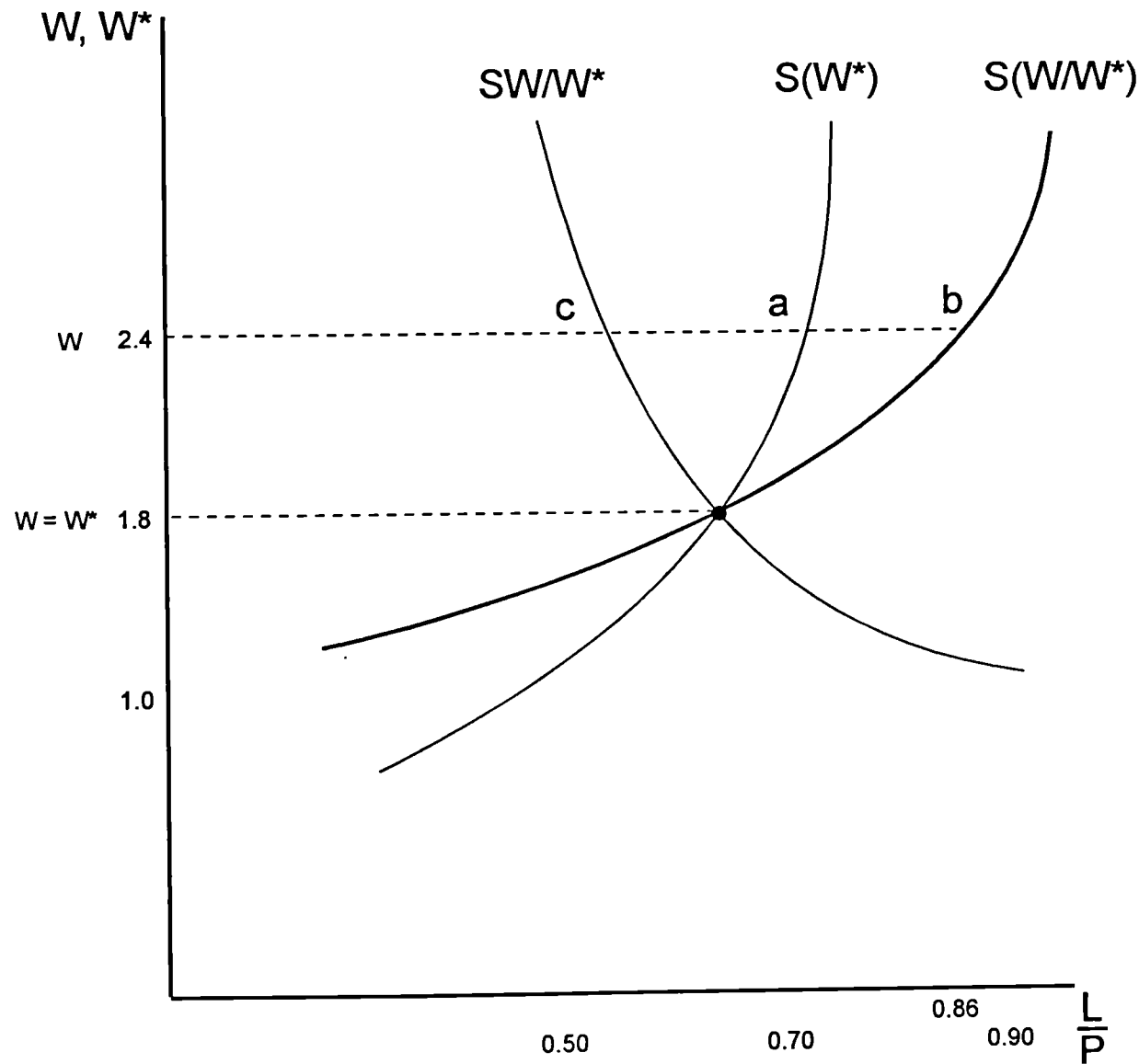


Figure 6.12

This means, individuals of this group are willing to work even when the wage rate is lower than clearing wage. It is relatively higher than the wage would be offered to them had they worked in their homes. Some individuals of this group supply their labour under disequilibrium wage condition when  $W > W^*$ .

Unemployment rate effect on labour supply is added-worker. The inflation rate also positively influences labour supply of this group. However, this variable may be represented as the excess demand for goods, so it may be as an indicator for excess demand for labour of this group, particularly those who are willing to supply their labour for lower than market-clearing wage.

In conclusion of this model, although there is an excess of labour of both supply and demand which is determined by market devices (price and wage), there also is a constant labour supplied by this group presented by domestic workers.

## 10 - Non-Bahraini Males Labour Supply Model

Because the model of non-Bahraini males when first is fitted by O.L.S. method shows a negative serial correlation, lag technique were applied in order to obtain the best model representing labour supply change of this group as a function of change on the explanatory variables. Adding four lag periods presents the best model. In Figure 6.13, the plot and histogram of the residuals show normality and the chart of the residuals shows a smooth series across the zero axis.

Results of the model are as follows:

$$\begin{aligned} MNL/P &= -0.109 + 0.00610W^* + 0.00971W/W^* \\ \text{add 4 lag} &\quad (-7.33) \quad (4.15) \quad (2.04) \\ &+ 0.00235U - 0.00671P/P^* \\ &\quad (2.60) \quad (-1.44) \end{aligned}$$

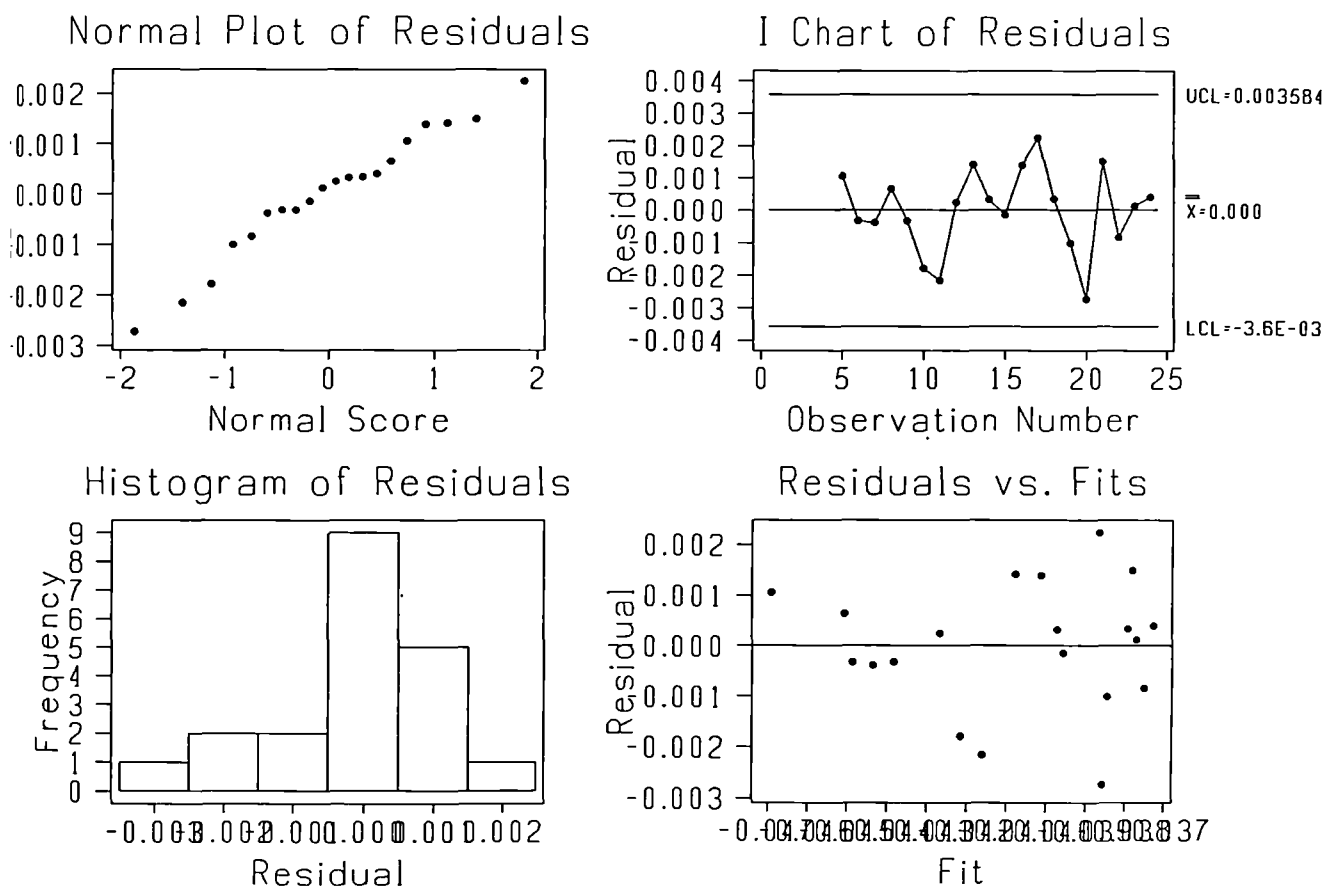
$$R\text{-sq} = 84.6\% \quad F = 20.58 \quad DW = 1.65$$

(*t*-values are given within parenthesis)

There is no autocorrelation. The coefficient of determination is highly significant, it explains about 85 percent of changes of labour supplied by this group.

Almost all the variables are significant. Elasticity of change on participation with respect to wage change is 0.06% over four periods of lifetime.

# Male Non-Bahraini Labour Supply



**Figure 6.13**

The relative wage indicates significantly a substitution effect on change of labour supply over four periods of lifetime. Change on labour supply curve is upward sloped. This model supports the importance of permanent wage hypothesis as  $B_2 > B_1$ .

Unemployment rate change effect on change of participation significantly indicates an added-worker effect. On the other hand, inflation rate change negatively influences change on participation. This finding is consistent with the permanent wage theory. Individuals of this group consider the permanent wage in light of the inflation rate, since their participation elasticity with respect to wage change is very low over four periods of their lifetime. However inflation rate variable maybe considered as a signal for a loose labour market towards males non Bahrainis labour force.

## 11 - The Model of Females Non-Bahraini Labour Supply

In terms of this model which is fitted by O.L.S. method and in order to explore the data, stepwise technique were applied, a good fitted model is illustrated in Figure 6.14.

The results of the model are as follows:

$$FNL/P = -4.87 + 0.607W^* + 0.481W/W^* + 0.507U + 0.813P/P^*$$

(-6.85)      (4.19)              (0.96)              (5.61)              (1.75)

$$R\text{-sq} = 82.7\% \quad F = 22.66 \quad DW = 1.41$$

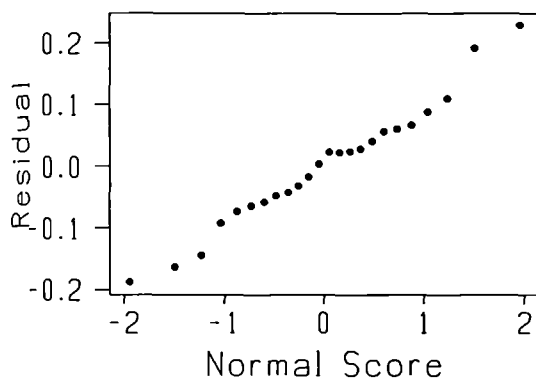
(*t*-values are given within parenthesis)

There is no autocorrelation. The coefficient of determination significantly indicates a good fit. The model explains about 83 percent of the variation. The substitution effect of permanent wage is highly significant, also relative wage is positive but is not significant. Labour supply curve of this group is upward sloped. The model supports the importance of relative wage or income theory.

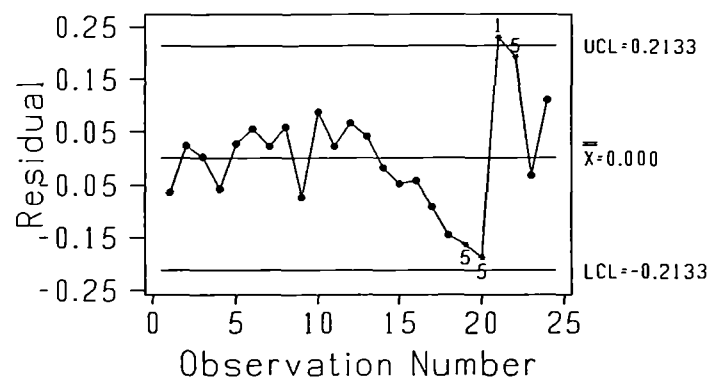
Unemployment rate coefficient also significantly indicates an added-worker effect on labour supply of non-Bahraini females. Inflation rate variable is as expectedly positive but is not significant. However if this variable is considered as the excess demand for goods, it may be as a proxy for excess demand for labour supplied by non-Bahraini females.

# Female Non Bahraini Labour Supply

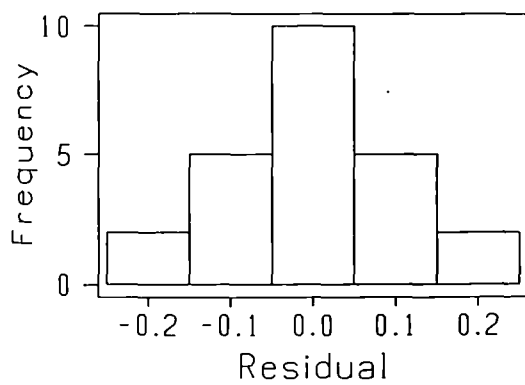
Normal Plot of Residuals



I Chart of Residuals



Histogram of Residuals



Residuals vs. Fits

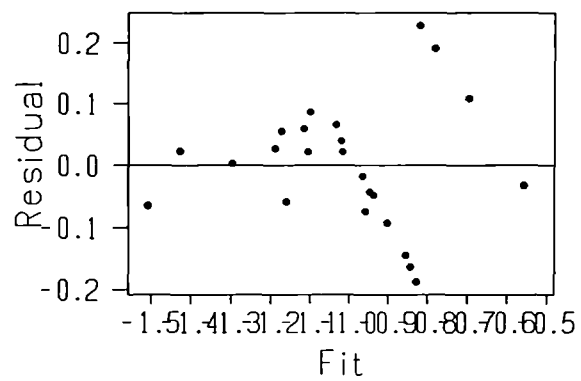


Figure 6.14

## Conclusion

In order to assess the results for all groups in a comparable way, table 6.1 provides values of the parameters estimates of all variables included in the labour supply model. We find that changes in participation in response to wage changes are almost alike. The elasticity of labour supply with respect to wage changes is rather low particularly for Bahrainis groups.

For Bahrainis secondary workers of age-group 15-19 and females, participation with respect to wage changes is inelastic. Also in the aggregate model, participation with respect to wage change is inelastic. Moreover the transitory labour supply elasticity is either negative or positive but small. These results confirm the labour supply function of both neoclassical long-run theory and keynesian short-run theory. In the long-run it is generally assumed that the supply of labour is inelastic function of the real wage rate. In the short-run, it is commonly assumed that the labour supply is infinitely elastic at some rigid real or money wage rate. On the other hand the results provide an evidence of inefficient wage that has prevailed in the Bahrain labour market. Also the results support the relative wage theory.

In terms of the unemployment rate, clearly added-worker has a positive dominant effect over all groups except for Bahraini group, unemployment rate parameters are significantly negative. It seems there has been trends of increasing duration of unemployment rate among Bahrainis that ultimately discourage them to search for jobs. It is also evident that inefficient wage is one problem facing Bahraini groups in the labour market. However, the results reveal a general trend towards excess of labour supply, particularly by Bahraini groups. This excess is either variably affected by increasing unemployment rates or constantly by increasing entrants to the labour force, especially females. On the contrary, excess of labour supplied by non-Bahrainis is affected by increasing demand for this group as the parameter of price is significantly positive, but at the same time the constant parameter is decreasing, probably by the effect of regulation tightening against foreign workers.



**Table 6.1****Labour Supply Model****Least Square Estimates for Variables for the Groups**

The Groups	Coefficients of the Variables (F test, t-values within parenthesis)							
	Constant	W*	W/W*	U	P/P*	T	R-Sq	D-W
TL/P	0.977 (10.42)	-0.183 (9.34)	-0.004 (2.92)	0.046 (2.98)	- -	- -	0.906 (51.40)	1.81
ML/P	0.948 (11.22)	0.063 (7.43)	-0.010 (3.24)	0.001 (0.18)	0.113 (2.26)	- -	0.920 (45.96)	1.63
FL/P	3.639 (7.12)	-0.696 (-6.52)	-0.499 (-1.03)	0.237 (2.64)	- -	- -	0.774 (19.44)	1.40
TL/PB	0.001 (0.41)	0.160 (2.82)	0.051 (3.54)	-0.003 (2.11)	- -	- -	0.550 (7.75)	1.70
ML/PB	0.001 (0.48)	0.072 (1.82)	0.065 (6.41)	0.007 (0.32)	- -	- -	0.718 (16.1)	1.79
L/P <sub>15-19</sub>	0.274 (1.96)	-0.765 (-2.40)	0.158 (0.94)	0.778 (1.88)	- -	-0.408 (-3.77)	0.591 (5.43)	1.81
L/P <sub>65+</sub>	31.870 (2.48)	0.647 (2.57)	0.262 (0.45)	0.269 (0.96)	-0.395 (-0.74)	-7.60 (-2.48)	0.650 (5.20)	1.74
FL/PB	20.515 (5.22)	-0.707 (-2.57)	-0.110 (-0.92)	0.277 (1.00)	- -	-4.28 (-5.17)	0.828 (19.27)	1.52
TNL/P	-0.734 (-11.22)	0.106 (7.95)	0.069 (1.50)	0.014 (1.70)	0.089 (2.09)	- -	0.832 (23.56)	1.53
MNL/P	-0.109 (-7.33)	0.006 (4.15)	0.009 (2.04)	0.002 (2.60)	-0.006 (-1.44)	- -	0.846 (20.58)	1.65
FNL/P	-4.870 (-6.85)	0.607 (4.19)	0.481 (0.96)	0.507 (5.61)	0.813 (1.75)	- -	0.827 (22.66)	1.41

## **CHAPTER SEVEN**

### **Unemployment**

#### **7.1 Introduction**

Unemployment has become the most economic problem facing the Governments. Has unemployment become a crucial issue in Bahrain's economy. In this Chapter and in order to answer this question taking into account the findings in the previous Chapter, firstly some consideration is given to the concept of unemployment and its relevant issues. The rest of this Chapter contains background and then an unemployment model is presented and analysed.

Considering the many explanations for unemployment the essence of the Keynesian explanation for unemployment is that there is a path from the fall of aggregate demand to the fall of output and unemployment. Firms demand too little labour because individuals demand too few goods. Keynes attacked what he called the classical presumption that persistent unemployment is voluntary unemployment. He argued that in competitive labour markets actual employment and unemployment reveal worker's true preferences between work and alternative uses of time, no one prefers to be unemployed if his real wage exceeds his marginal valuation of his free time. Keynes found decisive evidence against the inference of voluntary unemployment as a result of stickiness of wages, presented in the willingness of workers to accept a larger volume of employment at a lower real wage resulting from an increase of prices.

When ever unemployment could be reduced by expansion of aggregate demand, Keynes regarded it as involuntary unemployment. He expected expansion to raise prices and lower real wages.

Additional employment not associated with a path of real wages rising at the rate of productivity growth leads to inflation. According to the natural unemployment rate hypothesis, there is just one rate of unemployment compatible with steady wage and price inflation, and this in the long run compatible with any constant rate of change of prices, positive, zero or negative. Only at the natural rate of unemployment are workers content with current and prospective real wages, content to have their real wages rise at the rate of growth productivity. Along the feasible path of real wages they would not wish to accept any larger volume of employment. Lower unemployment therefore can arise only from economy-wide excess demand for labour. One answer to this problem is that the government should step in and boost aggregate demand by manipulating the fiscal and monetary instruments under its control, either increasing government expenditure or raising the money supply. (Further details in the following Chapter).

Against Keynesian view classical economists argued that any fall in wages and prices would itself produce an increase in aggregate demand as a result of a real balance effect, means that the fall in prices would increase the real value of money giving rise to increased expenditure. The classical view was that markets had a natural tendency to clear and that the reason for might not do so was because of government regulations or misperceptions by firms and workers about prices and wages. The definite result of this view was that unemployment could be eliminated either by removing the government distortion or that unemployment must be voluntary, because agents formulated these wages and prices expectations quite freely.

Early Keynesian theory has widely come to be regarded as deficient for it contained no detailed microeconomic underpinning. In post-Keynesian theory microfoundations were provided. Agents were viewed as pursuing the same objectives and operating under the same constraints as in

neoclassical theory, but in addition the possibility of rationing was taken into account. Rationing arose due to the failure of wages and prices to move to clear markets. Some economists argue that this in turn highlighted a further weakness of Keynesian theory, namely its failure to provide a theoretical explanation for the existence of rigid wages and prices.

The Phillips curve was initially suggested to provide the microeconomic foundations of Keynesian theory. It suggested the existence of trade-off between money wage rises and unemployment and admitted the possibility of persistent periods of unemployment. The neoclassical theory emphasized that the trade-off proposed by Phillips curve could emerge only as a result of misperceptions about changes in wages and prices, this led to the development of “expectations augmented” Phillips curve. But both the original and augmented Phillips curve had difficulty accounting for developments in the world during the 1970’s and 1980’s. At that time both wages and unemployment appeared to be rising, a phenomenon that became known as ‘stagflation’. Modern classical economists found the development of contract theory and other explanations of sticky wages and prices to illuminate this phenomenon is required.

## **7.2 Neoclassical Explanation of Unemployment and Job Search**

A further neoclassical explanation of unemployment emphasizes the consequences of information imperfections in the labour markets. Information is no longer supplied immediately and costlessly to individuals, instead they have to devote time and resources to gathering it. A certain amount of search unemployment is there for normal. This search explains why the rigidity and stickiness of wages. An employee will not necessarily accept a pay cut to retain a job, even though some current wage ‘income’ is better than facing unemployment. An employee

correctly and sensibly believes he can with some search and evaluation of alternatives get approximately his current wage at some other job.

If searching and finding out is more costly while employed, he may have reason to choose temporary unemployment as an efficient way of investing in information.

Information search by employers for best employees are the counterpart to unemployment. An employer searching for more employees will come to learn that a higher wage will get more employees. Employer search activity will increase the incidence of job changes without the employees having experienced unemployment, because employers will seek currently employed labour and offer better wages. Uncertainty of the employer about the quality of a potential employee induces a lower initial wage offer. The best perceived offer to a prospecting employee will reflect both the applicant's costs of canvassing all employers and the employer's cost of learning more about the applicant.

Because of production conditions, the greater the rate of interproduct demand shifts, the larger unemployment will be. In such cases interproduct demand shifts will determine the degree of unemployment that is associated with full employment. But if aggregate demand changes, there will be a change in the degree of unemployment. A decrease in aggregate demand and output causes an increase in unemployment because more people will accept unemployment to engage in search, but each unemployed person will look longer than expected. Because markets are incomplete, agents cannot insure themselves against the idiosyncratic risk they face in their job opportunities. Job opportunities will diminish in the sense that lower wages are available elsewhere. By the time people learn that the failure to find other equally good job options as quickly as they thought reflects diminished alternatives in general, which associate with the idiosyncratic risk. The

slower rate of rise of best deserved options is at first taken as an unlucky string of searches and no unemployment is extended in the expectation of shortly finding that elusive best option. Then with each person looking and searching longer the total number of unemployed at any one time will get larger. Meantime aggregate unemployment rate rises. Each now has the added task of revising his whole pattern of expectations. Whereas agents formerly was searching for a higher formulated expected wage, now must learn that the best option has deteriorated. It seems that idiosyncratic shocks are important in determining the unemployment rate. For example; Greenwood, MacDonald and Zhang (1996) estimated that about only 1% point of the unemployment rate can be accounted for by the aggregate shock of the economy. Gomes, Greenwood and Rebelo (1997) estimate that about 0.6 percentage points of unemployment rate is contributed by aggregate shocks, and about 0.5 percent points is accounted by business cycle factors. Therefore they suggested that the emphasis on stabilization policy as a remedy for unemployment may not be effective.

However, if the decrease in aggregate demand is a continuing affair (associate with a continuing fall in the stock of money) unemployment will persist at the higher level during the continuing decrease of demand. The greater the rate of decrease of aggregate demand the greater the extent and average duration of unemployment. Also Gomes, Greenwood and Rebelo (1997) estimated that output and duration of unemployment is negatively correlated by about 0.83 percent. Holding aggregate demand at its new prevailing level would reduce unemployment. But the costs of that type of recovery may be greater than action designed to increase aggregate demand back to the level that people expect.

Conversely, if the aggregate demand increase resulting from the increase in money stock (unanticipated) job vacancies will be increased and this will increase the search by employers for information about available

employable resources. Meaning the alternatives are better than they formerly were expected to be.

### **7.3 Unemployment and Inflation**

Changes in aggregate demand confuse the public. Each seller notices a changed demand for his current product, but he cannot be sure if that is a change also in aggregate demand which affects options elsewhere.

Whether he should shift to another option or should not if the demand change is general, or stay where he is and change price. It is the crucial question that is to be answered. Symmetrically, should an employee switch jobs upon receipt of a superior offer or should he look over the market more fully? given inter product fluctuations, any person who refuses unemployment search for the best alternative option can be misled into accepting another job too soon. Because of increasing demand, he will more easily find a job with higher wages than he now gets. The opportunity to search while not employed is better than the lack of an opportunity to move to unemployment as a more efficient means of search. Given interproduct demand shifts, the extent to which resources are in their most valuable uses is reduced, because the public is fooled into believing they have found the best available jobs, when in fact they have failed to invest in enough search to find best available jobs.

In fact, constant per capita aggregate demand is consistent with falling prices of final product. So falling consumer good prices in this case reflect lower costs of production, not reduced profitability of production and resources prices will not fall.

If there is an unanticipated inflation trend the increased unanticipated aggregate demand per capita will reduce unemployment rate and maintain it at its lower level. But if inflation is correctly anticipated, the rate of employment implied for any given rate of change of aggregate demand

will be lower than for unanticipated inflation and it will independent of the anticipated rate of inflation. A reduction in demand for a firm involves a lag of wage rate decreases behind prices, which is a rise in real wage or relative wage rates. This rise implies lower employment because of diminishing marginal returns to labour inputs. It follows that a general economy-wide demand decrease does not imply a correlation between real wage rates and depression (unemployment). Wage rates can fall as fast as other prices and that fall is not necessary for unemployment. To see why it does not cause unemployment, consider the following question: why would a cut in money wages provoke a different response than if the price level rose relative to wages when both would amount to the same change in relative prices, but differ only in the money price? The answer is that price level rise conveys different information and money wages everywhere have fallen relative to prices. On the other hand a cut in one's own money wage does not imply options elsewhere have fallen. A cut only in one's person job is revealed. The money versus real wage is not the relevant comparison, but the wage in the present job versus the wage in all other jobs is the relevant comparison. This rationalizes Keynes' definition of involuntary unemployment in terms of price level changes. If wages were cut everywhere else, and if employees knew it, they would not choose unemployment, but they would if they believed wages were cut just in their current job. When one employer cuts wages, this does not mean cuts elsewhere, his employees rightly think wages are not reduced elsewhere. On the other hand with a rise in the price level, employees have less reason to think their current real wage are lower than they are elsewhere. So they do not immediately refuse a lower real wage induced by a higher price level, where as they would refuse an equal money wage cut in their present job. It is the revelation of information about prospects elsewhere that makes the difference. This is consistent with 'Keynes' definition of unemployment and with his entire theory of market-adjustment process.



## 7.4 The Structural Unemployment

As we have seen, the labour market is imperfect due to misleading information. Therefore it plays an essential role in generating structural unemployment. On principle structural unemployment is at zero excess demand and it occurs because of normal labour market turnover (cycle) as will be explained later in this Chapter. The slower that turnover proceeds the greater will be the number out of work at the natural rate.

Unemployment due to these normal labour market flows is called by economists “frictional” unemployment. But there will be some individual workers for whom their own probability of receiving a job offer is close or actually equal to zero. These workers are defined as the structurally unemployed. The existence of these structurally unemployed individuals with a zero offer probability will lower the aggregate offer probability. Any increase in the extent of structural unemployment will therefore raise the natural rate of unemployment.

The sum of frictional and structural unemployment is a measure of full employment (equilibrium) unemployment as we saw in the previous Chapter in total labour supply model . If this unemployment exceeds vacancies available then supply exceeds the demand of labour.

Unemployment, therefore exceeds the full employment level by an amount which is called non-natural unemployment.

Economists of market clearing view regard all unemployment at the natural rate is voluntary. This notion emerges from the fact that any workers choosing not to work at the market clearing wage do so because that wage does not compensate them for the disutility of work. In the case of structurally unemployed workers the situation is unambiguous. There are workers who get no offers, they would accept any offer if only they got one. In this case it is clear that such workers are involuntarily unemployed and will remain so when unemployment is at its natural

level. For other workers the voluntary or involuntary unemployment makes less sense. Generally all will be constrained by the rate of job offers and to that extent some part of their unemployment duration is involuntary in the sense that in the absence of this constraint, they could freely choose the period spent out of work. As a result of this constraint also, workers spend more time searching for employment than would otherwise be the case. So some part of their unemployment spell can therefore be regarded as involuntary. But of course, part of normal job search is voluntary.

Other economists (Rowthorn 1980) suggest that structural unemployment is the result of employers reorganising their production methods scrapping equipment and eliminating excess capacity so the increases in the rate of technical change are not offset by falls in the rate of capital. But the effect of structural unemployment (of the Keynesian type) is the same, that if unemployment is in excess of natural rate exists, it is converted into structural unemployment and so it becomes part of the natural rate itself.

#### **7.4.1. Causes of Structural Unemployment**

It is well known that a decline in the secular rate of growth of output could arise for any number of reasons. Clearly it could be the consequence of a secular fall in rate of growth of aggregate demand for goods and services (non-market clearing or Keynesian view) or also as a consequence of increasing real wage levels (market clearing view). Most literature has been concentrated on the production sector and in particular industrial sector. In most advanced industrial countries the effects on unemployment of the decline in production sector jobs has been considered in a number of studies, for example in Britain (has experienced an increasing structural unemployment rate). Nickell (1982) finds that the

decline in production industry jobs has had a significant effect on reducing the outflow probability of aggregate unemployment. This raised the equilibrium (natural) rate of unemployment by 1.4 percentage points over the period 1969-1977. Junanken and Price (1983) confirm these findings. It would seem therefore, that declining output and employment growth and the consequential increase in hiring standards in the production sector of the economy have had notable effects on the natural rate of unemployment.

Besides industrial component Nickell (1982) also present evidence on the extent of structural unemployment in Britain caused by regional and occupational components. In this Chapter we will see that differences of unemployment rates among regions in Bahrain, are much more marked in the 1991, these differences then led to unemployment rates as two times as high in the Western region compared with Hidd region. Nickell (1982) found about three times as high in the North compared with the South in Britain. Some economists like Bosanquet (1978) have found that age is now a more important source of structural unemployment than location or industry. In conclusion structural unemployment causes needs further research.

In Bahrain a significant deterioration in the relative unemployment position of young workers and this may cause increased structural unemployment amongst these groups. This kind of structural unemployment in which young workers with low probability of employment become a large proportion of the total stock leads to a decline in the economy wide average employment probability and hence a rise in natural unemployment rate.

A further source of increasing structural unemployment may arise from the changing duration composition of the unemployed stock. Duration of unemployment has been rapidly rising amongst specific age groups and in general average which means a dramatic decline in re-employment probability. Although the evidence is not at all conclusive, it would seem that workers may be scarred by long unemployment. In some cases this may reflect the effect of long unemployment on skills, attitudes to work and so on. In addition employers may respond to this by assessing the training costs of employing a long term unemployed person as being higher than for some one currently or recently in employment. In this case the firm will raise its hiring standard, as it is the case in Bahrain labour market now which means further lowering to the offer probability for the long duration unemployed [why this happens is explained later in this Chapter]. There may also be a further significant aspect to this behaviour. If employers regard (rightly or wrongly) the long term unemployed as workers who have failed to get a job because they are of a low standard he will not make offers to them at all. Since there has been a general rise in the mean unemployment duration length, this could lead to a fall in the average offer probability and hence to an increase in the natural employment value.

Nevertheless, what is clear so far is that it is not mainly their location, their occupation or their professional experience that is the problem for unemployed workers. If anything as Knight (1987) suggests it is the age of the unemployed, those of age group (15-19), and the debilitating effects of long periods of unemployment on skills, aptitude motivation and acceptability for work that causes their structural unemployment.

Further analysis in this Chapter will provide more evidence on the significance of some of these factors which could be substantial in causing structural unemployment. Also structural unemployment can arise in Bahrain from secular stagnation caused by specific sector like banks or general decline in employment in some specific area like Western region. Generally it is of great consideration the possibility that left untreated in a stagnant economy non-natural unemployment can be converted into structural unemployment that raises the natural rate. In Bahrain the evidence is not clear cut but incidences that this is now a real possibility. The argument rest upon the view that the aggregate labour market clears very slowly or not at all and non-natural unemployment persists for a long time. In aggregate labour supply model in the previous Chapter we found that labour market in Bahrain's economy took four years to clear, therefore. Even if real wages were eventually to fall as the case in Bharian labour market, this may not induce employers to employ workers who because of age, and lack of skill or long periods of idleness are regarded as having a low or even zero marginal product in their firm. Even the efficient operation of the labour market price will not reverse the increase in unemployment that has taken place. Market clearing is only then achieved through an eventual increase in the equilibrium market clearing rate of unemployment which is the case of Bahrain's economy now as clearly proved by significant added workers effect of unemployment in aggregate labour supply model.

In the absence of clear policy to deal with this form of structural unemployment only death or retirement will reduce it.

## 7.5 The Costs of Unemployment

Unemployment has profound social and economic costs both for the individual and for the community as a whole. The economic costs are represented by the value of the forgone output of the unemployed. Correspondingly for the individual income is lost and levels for both goods and leisure are reduced and changed. The social costs are more difficult to quantify but many are substantial both for the individual and for the community. For the individual, it has been accorded that unemployment leads to an increase in mental and physical illness. Empirical work has also focused on association between unemployment and mortality, suicide, crime, marital breakdown, divorce and child abuse. In fact each of these areas researcher face difficulties in establishing the directions of causability but the view is widely held that unemployment was a contributory factor to the growth in each of these during the 1980's in most of the advanced industrial nations. Central to this view is the idea that employment provides both income and a set of relationships or network contributing toward a structured, secured and meaningful life. Deprived by unemployment individuals may suffer from stress and anxiety, and as a consequence of this and lower income, may adopt unhealthy consumption patterns, ranging from poor diet to drug and alcohol abuse. From these individuals suffering community social costs occur. Part of the community cost is represented by the impact of higher unemployment and hence on the income (wage) and job prospects of those currently in work, other by declining of the quality of the community's labour force with increases in the average duration of unemployment as the case in Bahrain's economy now. Social disruption, mental health, sickness and mortality are other forms of community social costs, for example: in Britain, a report from the select committee of the House of Lords on Unemployment in 1982 concludes "anecdotal evidence, supported by some research appears to confirm a casual link (between unemployment and crime); and unemployment provides both

motive and opportunity for crime, we believe unemployment to be among the causes of ill-health, mortality, crime or civil disorder”.

Our concern is the understanding of the explanation of the psychological effects of unemployment. Obviously, psychologists of all generations have been discovering the intricate intertwining of material deprivation and the psychological experience of unemployment. It seems that almost everyone involved with unemployed people has been struck by the role of poverty in their distress. This includes social anthropologists, government social dealers, leisure scholars, sociologists and social commentators.

In fact there can be little doubt that in the State of Bahrain unemployed people (without any kind of unemployment benefit) do suffer from a process of cumulative disadvantage and that their weak labour market position leads to great financial difficulties and consequently to a disturbing degree of social distress. Gallie and March (1994) conclude “unemployment, then leads to social polarisation at the level of economic and social experience and it heightens political radicalism” (Gallie and March 1994: 28). Finally, what can we say about the unemployed as a group is to address the question: is whether those who pay the costs of society’s economic difficulties are the same group of people across time and whether they are a group with a distinct character at the bottom of the heap, but they were not destined to be there, and under different labour market conditions they would not have been there. The answer of this question will be in the following part of this Chapter.

## **7.6 The Picture of Unemployment and Background**

During the 1950’s and 1960’s, the total number of unemployed in the State of Bahrain was zero. But within just one decade, from 1971 to 1981 this number jumped from 421 to 8241. The subsequent prolonged economic expansion increased the number of unemployed to 14378 in 1991. In fact

by the late 1980's, unemployment was still not a crucial policy issue in the State of Bahrain. This was partially due to the lack of exact statistics.

Has unemployment become the most serious economic problem facing the State of Bahrain? One way of answering this question is to compare unemployment levels over time and between countries. In the early 1970's unemployment in the State of Bahrain was below 3 percent. During the 1970's unemployment did rise but it was not as much as it was during the 1980's when it grew fast. In 1981 unemployment rate was 3.2 percent, while in 1991 unemployment rose to 6.3 percent, almost doubled within one decade. Unemployment rate of Bahrainis active population (labour force) rose from 6.6 percent in 1981 to almost 15 percent in 1991, as it is clear from Table 7.1.

Unemployment rates of Bahrainis are higher than those of the expatriate (non-Bahraini). Bahrainis young people continue to experience a much higher rate of unemployment than adults do. Table 7.1 shows that Bahrainis of age group 15 to 19 have experienced a sharply increased high rate since the early 1970's, it reached almost 64 percent in the early 1990's. Males age group 15-19 had 57 percent unemployment rate and almost 28 percent for age group 20-24 in the early 1990's as stated in Table 7.2. Women have suffered higher unemployment rates than men have had.

Table 7.3 shows that Bahrain's women have had around 3 percent unemployment rate in the early 1970's and very sharply increased throughout the two decades, it reached around 25 percent in the early 1990's. Bahrain's young women (15-19 age group) have too experienced a higher rate of unemployment than adult women have had, Table 7.3 shows that while it was around 7 percent in the early 1970's it climbed to around 87 percent in the early 1990's. For women age group of 20-24 it was almost 3 percent in the early 1970's, rose to almost 52 percent in the



**Table 7.1**

**Unemployment Rate of Bahraini Population (15 Yrs + ) by Age Group for the  
Census Years 1971 \_1981 \_1991**

Age Group	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
Total	38091	1416	3.7	61199	4021	6.6	90662	13394	14.8
15-19	4024	429	10.7	5289	1493	28.2	4977	3178	63.9
20-24	5987	336	5.6	14146	1537	10.9	15978	5440	34.0
25-29	5280	123	2.3	11712	460	3.9	18613	2197	11.8
30-34	4194	85	2.0	7125	136	1.9	15525	924	6.0
35-39	4511	93	2.1	4564	77	1.7	11941	543	4.5
40-44	3479	64	1.8	4446	60	1.3	7740	265	3.4
45-49	3469	112	3.2	4213	81	1.9	4522	138	3.1
50-54	3018	99	3.3	3756	75	2.0	4075	204	5.0
55-59	1484	74	5.0	2659	57	2.1	3326	213	6.4
60-64	1355	1	0.1	1692	28	1.7	2061	231	11.2
65 +	1290	—	0.0	1597	17	1.1	1904	61	3.2

**Table 7.2**

**Unemployment Rate of Bahraini Males (15 Yrs + ) by Age Group for the  
Census Years 1971 –1981 –1991**

Age Group	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
<b>Total</b>	<b>35884</b>	<b>1369</b>	<b>3.8</b>	<b>51949</b>	<b>2645</b>	<b>5.1</b>	<b>73118</b>	<b>9035</b>	<b>12.4</b>
<b>15-19</b>	<b>3742</b>	<b>411</b>	<b>11.0</b>	<b>4122</b>	<b>921</b>	<b>22.3</b>	<b>3871</b>	<b>2213</b>	<b>57.2</b>
<b>20-24</b>	<b>5365</b>	<b>320</b>	<b>6.0</b>	<b>10272</b>	<b>903</b>	<b>8.8</b>	<b>12135</b>	<b>3446</b>	<b>28.4</b>
<b>25-29</b>	<b>4658</b>	<b>118</b>	<b>2.5</b>	<b>9321</b>	<b>314</b>	<b>3.4</b>	<b>13892</b>	<b>1299</b>	<b>9.4</b>
<b>30-34</b>	<b>4067</b>	<b>85</b>	<b>2.1</b>	<b>6246</b>	<b>120</b>	<b>1.9</b>	<b>11639</b>	<b>592</b>	<b>5.1</b>
<b>35-39</b>	<b>4355</b>	<b>90</b>	<b>2.1</b>	<b>4202</b>	<b>73</b>	<b>1.7</b>	<b>9649</b>	<b>415</b>	<b>4.3</b>
<b>40-44</b>	<b>3354</b>	<b>62</b>	<b>1.8</b>	<b>4211</b>	<b>59</b>	<b>1.4</b>	<b>6760</b>	<b>242</b>	<b>3.6</b>
<b>45-49</b>	<b>3380</b>	<b>111</b>	<b>3.3</b>	<b>4050</b>	<b>79</b>	<b>2.0</b>	<b>4130</b>	<b>131</b>	<b>3.2</b>
<b>50-54</b>	<b>2949</b>	<b>99</b>	<b>3.4</b>	<b>3652</b>	<b>75</b>	<b>2.1</b>	<b>3877</b>	<b>198</b>	<b>5.1</b>
<b>55-59</b>	<b>1445</b>	<b>73</b>	<b>5.1</b>	<b>2619</b>	<b>56</b>	<b>2.1</b>	<b>3235</b>	<b>209</b>	<b>6.5</b>
<b>60-64</b>	<b>1316</b>	<b>—</b>	<b>0.0</b>	<b>1672</b>	<b>28</b>	<b>1.7</b>	<b>2038</b>	<b>229</b>	<b>11.2</b>
<b>65 +</b>	<b>1253</b>	<b>—</b>	<b>0.0</b>	<b>1582</b>	<b>17</b>	<b>1.1</b>	<b>1892</b>	<b>61</b>	<b>3.2</b>

**Table 7.3**

**Unemployment Rate of Bahraini Females (15 Yrs + ) by Age Group for the  
Census Years 1971 \_1981 \_1991**

Age Group	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
Total	1843	47	2.6	9250	1376	14.9	17544	4359	24.8
15-19	282	18	6.4	1167	572	49.0	1106	965	87.3
20-24	622	16	2.6	3874	634	16.4	3843	1994	51.9
25-29	258	5	1.9	2391	146	6.1	4721	898	19.0
30-34	127	—	0.0	879	16	1.8	3886	332	8.5
35-39	156	3	1.9	362	4	1.1	2292	128	5.6
40-44	125	2	1.6	235	1	0.4	980	23	2.3
45-49	89	1	1.1	163	2	1.2	392	7	1.8
50-54	69	—	0.0	104	—	0.0	198	6	3.0
55-59	39	1	2.6	40	1	2.5	91	4	4.4
60-64	39	1	0.0	20	—	0.0	23	2	8.7
65 +	37	—	0.0	15	—	0.0	12	0	0.0

early 1990's. Comparing with youth unemployment rates in some developed industrial countries, it was about 14 percent in North America, in Italy (highest rate of the EC) it was around 31 percent and Finland (highest of the EFTA) was around 31 percent in 1992. Comparing with women unemployment rates, it was around 11 percent in North America, around 60 percent in Ireland (highest of the EC), about 24 percent in Norway (highest of EFTA) and only about 15 percent in Japan in 1992.

In the State of Bahrain, there is an evidence that a low structural unemployment and cyclical unemployment is now growing in Bahrain's economy as found in labour supply model in Chapter Six of this Thesis.

Within the State of Bahrain differences of unemployment rates have grown higher among regions as stated in Table 7.4. Most of the regions have experienced high unemployment rates and much more has been a persistent is in Sitra. During the last two decades Bahrainis in Sitra suffered a structural unemployment, it jumped from around 6 percent in the early 1970's to 21 percent in the early 1990's. Jidhafs, Northern area and Hidd have had a relatively high unemployment during the last two decades but it was cyclical and may have converted into a structural unemployment in the early 1990's. Women in most areas have suffered a higher unemployment rates than men as stated in Tables 7.5 and 7.6. Unemployment rose to around 51 and 48 percent in Western region and Sitra respectively in the early 1990's.

The severity of unemployment depends not only on the risk of becoming unemployed but also the probability of remaining so for a long time. There are striking differences in the share of long term unemployment in total unemployment. Around 77 percent of total Bahraini's unemployed had been out of work for one year and more in 1991. Comparing with other countries, about 40 percent of total unemployed had been out of work for one year and more in the European community, around 15

Table 7.4

Unemployment Rate of Bahraini Population (15 Yrs + ) by Region for the  
Census Years 1971 \_1981 \_1991

Region	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
	(1)								
Hidd	10138	461	4.5	1882	174	9.2	2154	230	10.7
Muharraaq	—	—	—	14123	942	6.7	16900	2158	12.8
Manama	13309	452	3.4	16824	1142	6.8	15830	2388	15.1
Jidhafs	3773	74	2.0	6391	379	5.9	9741	1903	19.5
Northern	1948	75	3.9	3325	228	6.9	5569	1039	18.7
Sitra	2047	125	6.1	3313	202	6.1	5369	1133	21.1
	(2)								
Central	2917	96	3.3	2547	140	5.5	5848	823	14.1
Isa Town	—	—	—	5996	387	6.5	9552	1388	14.5
	(3)								
Riffa	2042	94	4.6	4349	308	7.1	8664	883	10.2
Western	1551	64	4.1	2378	119	5.0	3649	794	21.8
Estern	2	—	0.0	71	—	0.0	414	22	5.3
	(4)			(4)					
Hamad Town	—	—	—	—	—	—	6973	633	9.1
Total	37727	1441	3.8	61199	4021	6.6	90663	13394	14.8

(1) Includes Muharraaq

(2) Includes Isa Town

(3) Includes Some of Eastern

(4) Not Yet Established

**Table 7.5**

**Unemployment Rate of Bahraini Males (15 Yrs + ) by Region for the  
Census Years 1971 \_1981 \_1991**

Region	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
	(1)								
Hidd	9622	445	4.6	1507	87	5.8	1625	123	7.6
Muharraq	—	—	—	11542	564	4.9	12979	1291	9.9
Manama	12314	433	3.5	13732	741	5.4	12339	1579	12.8
Jidhafs	3738	74	2.0	5911	266	4.5	8329	1418	17.0
Northern	1918	72	3.8	3102	174	5.6	4846	770	15.9
Sitra	2037	125	6.1	3218	175	5.4	4857	889	18.3
	(2)								
Central	2812	89	3.2	2364	104	4.4	4937	635	12.9
Isa Town	—	—	—	4709	232	4.9	7252	807	11.1
	(3)								
Riffa	1890	91	4.8	3496	198	5.7	6546	479	7.3
Western	1551	64	4.1	2308	104	4.5	3291	612	18.6
Estern	2	—	0.0	60	—	0.0	362	15	4.1
	(4)			(4)					
Hamad Town	—	—	—	—	—	—	5755	417	7.2
Total	35884	1393	3.9	51945	2645	5.1	73118	9035	12.4

(1) Includes Muharraq

(2) Includes Isa Town

(3) Includes Some of Eastern

(4) Not Yet Established

**Table 7.6**

**Unemployment Rate of Bahraini Females (15 Yrs + ) by Region for the  
Census Years 1971 \_1981 \_1991**

Region	1971			1981			1991		
	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate	Active POP	Unemp POP	Unemp Rate
	(1)								
Hidd	516	16	3.1	375	87	23.2	529	107	20.2
Muharraaq	—	—	—	2581	378	14.6	3921	867	22.1
Manama	995	19	1.9	3092	401	13.0	3491	809	23.2
Jidhafs	35	—	0.0	480	113	23.5	1412	485	34.3
Northern	30	3	10.0	223	54	24.2	723	269	37.2
Sitra	10	—	0.0	95	27	28.4	512	244	47.7
	(2)								
Central	105	7	6.7	183	36	19.7	911	188	20.6
Isa Town	—	—	—	1287	155	12.0	2300	581	25.3
	(3)								
Riffa	152	3	2.0	853	110	12.9	2118	404	19.1
Western	1	—	0.0	70	15	21.4	358	182	50.8
Estern	—	—	0.0	11	—	0.0	52	7	13.5
	(4)			(4)					
Hamad Town	—	—	—	—	—	—	1217	216	17.7
Total	1844	48	2.6	9250	1376	14.9	17544	4359	24.8

(1) Includes Muharraaq

(2) Includes Isa Town

(3) Includes Some of Eastern

(4) Not Yet Established

percent in EFTA and Japan and only 11 percent in North America. The incidence of long-term unemployment differs considerably by age group. In Bahrain where youth population is the majority we found that in 1991 about 64 percent of long-term unemployment were young people (15-24, age group) and that older people were at less risk of experiencing prolonged unemployment. Comparing with some other countries many young people still face prolonged unemployment, in Greece, Ireland, Italy and Spain. The incidence of long-term unemployment among unemployed youth ranges between 50 and 70 percent.

An important observation that I found particularly striking in the data of State of Bahrain, is the remarkably inverse relation between duration and turnover of unemployment in various cross sections, most notably across age groups and regions. This leads to the conclusion that longer expected duration of unemployment in Bahrain may discourage a certain group of positively response to market signals as confirmed by Bahrainis labour supply model in Chapter Six. This discouraged-worker effect may result in a productivity loss in Bahrain labour market as found earlier in Chapter Three of this Thesis. It is interesting to note that the data of duration in State of Bahrain showed that between 1981 and 1991 the increase in unemployment that occurred was mostly due to increased duration of unemployment. It is an evident that Bahrain labour market is inefficient, in the sense that job seekers are unmatched with vacancies. This supports Beveridge Curve in terms of the relationship between structural unemployment and vacancies as depicted in Figure 7.1. How structural unemployment occurs over disequilibrium labour market.

In reality inflows and outflows of unemployment over equilibrium are rarely equal. What happens is that stock of unemployment increases in slumps economy and decreases in booms. In a slump the inflow will exceed the outflow and unemployment rates will increase. To explain this process in the Bahrain labour market, assuming initially the economy in



the early 1980s is at full employment when the rate of unemployment is natural (about 3 percent) and there is a once and for all increase in the inflow unemployment rate, now there will be a shift in the Beveridge Curve UV outward and an increase in unemployment above natural rate. If this increase falls to its long run level the curve UV returns where now the combination of unemployment and vacancies is above the stationary level. What happens next, with unchanged offer and acceptance possibilities, the time taken to fill a vacancy falls with a greater number out of work applicants per time period increase and vacancies can be filled more rapidly at the given hiring standard. The result is an eventual fall in the stock of vacancies. The adjustment process will be complete at a period where unemployment is in excess of the natural level. Only if there is subsequently a boom, like the period from 1971 up to 1985, a compensating and equivalent once and for all decrease in the inflow rate will the process be set in reverse with a transitory shift in the curve UV. Now vacancies will take longer to fill and the increasing stock of vacancies will eventually restore the labour market to its original position in early 1980s. If cyclical behaviour in the labour market is characterised by these once and for all changes in the inflow rate we should expect equivalent movements around the curve UV.

In fact in a recession like the one in 1986 this will not be the first manifestation of the recession in the labour market. First response will be a reduction in the vacancies by employers and then raising of the hiring standard. This happens because of the reduction in the costs of search to the employer. Now since the raising of hiring standard cuts the offer probability for unemployed this will shift the curve outward with an increase in unemployment. Since vacancies are also cut it ends up to long duration of unemployment and increase in the stock of unemployed. In other words an increase in structural unemployment with a total unemployment rate (frictional + structural) of 6.3 percent in 1991, or almost has doubled within one decade.

## The Beveridge Curve

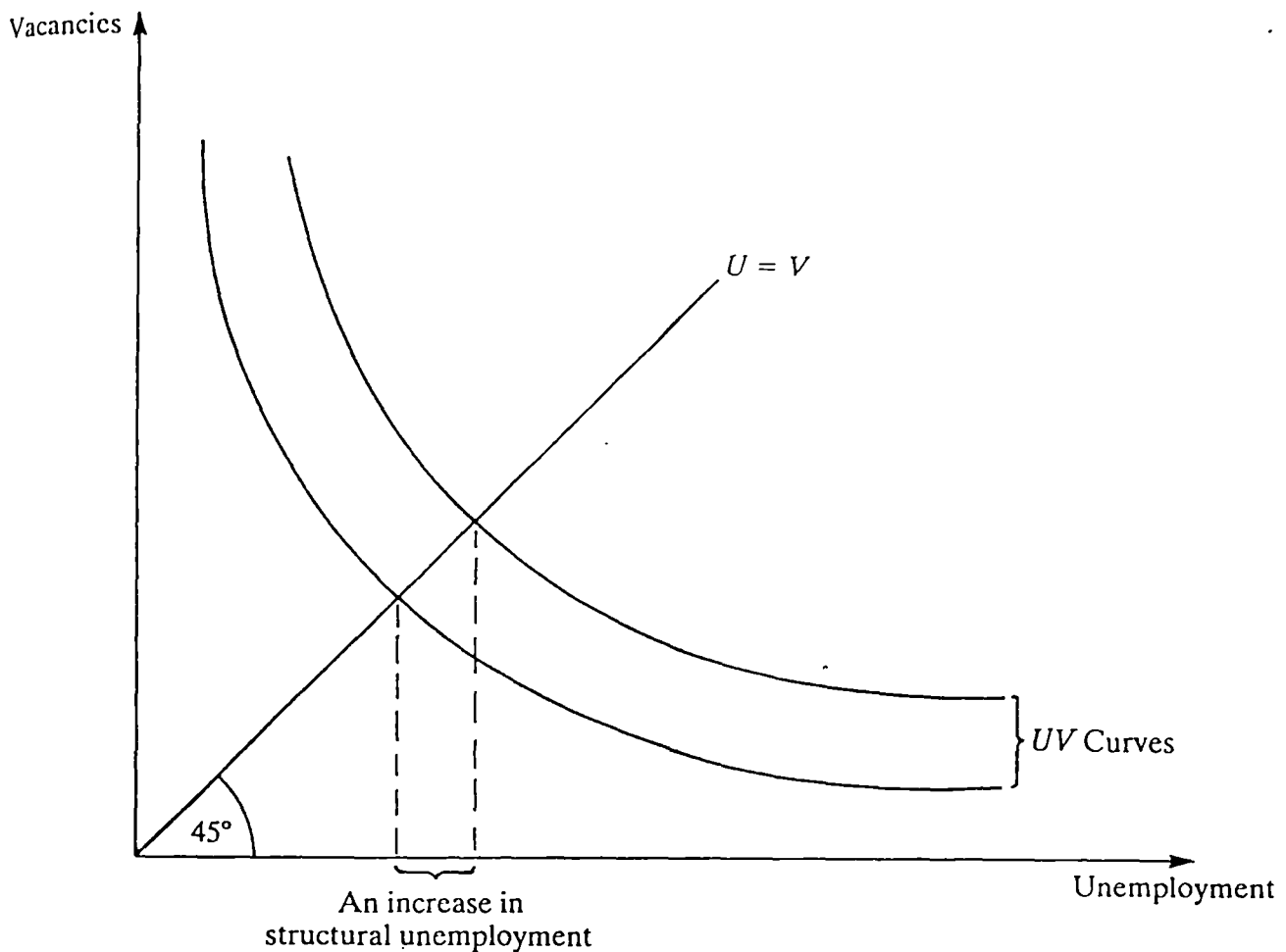


Figure 7.1

The Beveridge curve reveals that an outward shift or UV curve indicates an increase in the frictional and structural components of unemployment. Along the  $45^\circ$  line, a given level of vacancies is matched by an equal level of unemployment. No matter how high vacancies rise unemployment will never fall to zero and vice versa.

The outward movements of the curve means a reduction in labour market efficiency of the State of Bahrain. Although vacancies were rising, through the boom in early 1980s unemployed were inappropriately equipped.

## 7.7 Unemployment Model

### 7.7.1 Introduction

It has been accorded that in the State of Bahrain over the period from 1930's to the beginning of 1980's, rates of unemployment were natural (about 3 percent). But the situation has been sharply different over the last decade particularly from 1981 to 1991. The rate of unemployment rose and persisted, also the demographic and social characteristics of unemployed people changed.

National unemployment rates have sharply risen over the last two decades, it has more than doubled throughout the period from 1981 to 1991; it jumped from 6.6 to 14.8 percent.

In this part of the thesis, and in the light of findings presented here and in previous chapters, we argue that the current persisting national unemployment may have converted into structural unemployment in Bahrain's stagnant economy. The findings so far provide evidence that secondary workers and some primary workers have become structurally unemployed. In other words, their own opportunity of receiving a suitable job offer and getting employed is very low. To find out who of these groups are more likely to be structurally unemployed. The aim of the unemployment model is to examine national unemployment rate as a function of some factors that may cause structural unemployment. It has been suggested in some research that the age of the unemployed and the debilitating effect of long-term unemployment on their skills, causes their structural unemployment, and that it is not only their occupation or their experience that is the problem for unemployed workers. Duration of unemployment as we have seen earlier in this chapter is very high compared with other industrial countries which

which have experienced structural unemployment. Unfortunately duration of unemployment and occupation of the unemployed are not technically convenient to be included in this model. Instead educational attainment and occupational choice are included. Use is made of cross-section data of Census 1991, with a total of 90662 observations.

The following transformed logistic model is estimated:

$$\text{Log} \frac{\pi_i}{1 - \pi_i} = B_0 + B_1 X_1 + B_2 X_2 + \dots + B_{16} X_{16} + \dots + B_{42} X_{42} + E_i$$

Where

$\pi_i$  represents the probability of being unemployed for a person in  $i$  subpopulation,  $i = 1, 2 \dots 3150$ .

$B_0$  is the intercept.

$B_1 \dots B_{42}$  are regression parameters of independent indicator variables with the exception of  $X_{16}$  which is a continuous variable representing the percentage of expatriates.

### 7.7.2 Model Specification:

By letting  $Y_i$  be a binary random variable takes the value '1' if the  $i$  person is unemployed and '0' otherwise  $i = 1, 2, \dots, n$ . Assuming that  $Y_i$  are independent.

Let the probability for being unemployed of the  $i^{\text{th}}$  person denoted by  $\pi_i$  relates to a set of predictors is the following functional form:

$$\pi_i(X) = \frac{\exp\left(B_0 + \sum_{j=1}^p B_j X_{ij}\right)}{1 + \exp\left(B_0 + \sum_{j=1}^p B_j X_{ij}\right)} \quad (1)$$

Where

$X_{i1}, X_{i2}, \dots, X_{ip}$  are explanatory variables.

$B_0, B_1, \dots, B_{42}$  are parameters.

Based on the equation (1).

$$1 - \pi_i(X) = \frac{1}{1 + \exp\left(B_0 + \sum_{j=1}^p B_j X_{ij}\right)}$$

Therefore

$$\frac{\pi_i(X)}{1 - \pi_i(X)} = \exp\left(B_0 + \sum_{j=1}^p B_j X_{ij}\right)$$

and

$$\log \frac{\pi_i(X)}{1 - \pi_i(X)} = B_0 + \sum_{j=1}^p B_j X_{ij} \quad (2)$$

The quantity  $\frac{\pi_i(X)}{1 - \pi_i(X)}$  is known as the odds of unemployment and

$\log(\text{odds})$  is referred to as logit of unemployment. The parameter

$B_j$  of the model measures the extent to which the explanatory

variables  $X_j$  are associated with the logit of unemployment,

controlling for all other variables in the model. The categorical variables are presented by a set of indicator variables.

The number of indicator variables is equal to the level assumed by the categorical variables minus one. The definition of the indicator variable depends on the type of model parameterization, which in turn determines how the parameters are interpreted. The present model uses full-rank centre-point parameterization in which the  $t$ -level factor is represented by  $(t - 1)$  indicator variables such that:

$$X_i = \begin{cases} 1 & \text{for level } i \\ -1 & \text{for level } t \\ 0 & \text{for level } j \end{cases} \quad j \neq i = i, j = 1 \dots 2 \dots t - 1$$

For example, the first categorical variable AGE<sub>G</sub> is as follows:

$$X_1 = \begin{cases} 1 & \text{if (15-19) age group} \\ -1 & \text{if (60+) age group} \\ 0 & \text{if otherwise} \end{cases}$$

The second indicator variable is: sex has two levels so we must have one indicator:

$$X_5 = \begin{cases} 1 & \text{if male} \\ -1 & \text{if female} \end{cases}$$

The interaction terms of age group and sex (AGE<sub>G</sub>\*SEX). We have 4 indicators for age group and 1 for sex =  $4 \times 1 = 4$ . These are:

$$X_6 = X_1 \times X_5; \quad X_7 = X_2 \times X_5; \quad X_8 = X_3 \times X_5; \quad X_9 = X_4 \times X_5$$

Accordingly in this model the parameter  $B_j$  is the difference between the logit of unemployment corresponding to level  $j$  and the mean logit of unemployment over all levels of this factor. In other words, the reference for comparison is the mean logit, hence the “notion” centre-point (Neter, Wasserrman and Kunter “Applied Linear Statistical Models” Second Edition, 1985). The centre-point parameterization is the default of the SAS procedure CATMOD which has been applied for this model estimation. The constraint under this type of parameterization is:

$$\sum_{j=1}^I B_j = 0$$

Hence, the effect of the last level ( $I$ ) can be measured indirectly as:

$$B_I = -\sum_{j=1}^{I-1} B_j$$

Two methods of regression techniques are performed general logistic and linear to fit the given data and to explain unemployment rate of native Bahrainis by the function of age, gender, marital status, educational attainment, occupational choice and the immigration factor presented by percentage of the foreign workers. To evaluate the fitting and the importance of the explanatory variables; likelihood and ordinary least squares method are used.

### 7.7.3 Definitions of the variables:

The response (dependent variables) is all Bahraini Labour force aged 15 to 60 years old employed and unemployed (total of 90662 observations).

The co-variates (independent variables) are:

1 - AGEG    Age groups as follows:

15-19 Secondary workers

20-24 Primary workers

25-29 Primary workers

30-59 Primary workers

2 - Sex

3 - MRTS    Marital status: of those in the labour force as single, married and divorced.

4 - PEREXPAT    Immigration factor: represented by percentage of expatriates.

5- EDUCAT Education factor, as follows:

Primary and below

Preparatory

Secondary

Above secondary

University



6 - SPGM Specialization programme or occupational choice groups: at those levels of education, specifically at the three last levels, secondary, above secondary and university. These specialization groups are:

General programmes

Business & administration and accounting programme

Trades, crafts and industry programme

Education sciences and teachers training

Humanities programmes

Mathematics and computer sciences programmes

Social sciences programmes

Medical diagnostics and treatment programmes

Natural sciences programmes

Engineering programmes

Miscellaneous programmes

#### **7.7.4 The Results**

First, the link between the dependent variable national unemployment rate and each of the independent variables is measured by constructing contingency tables . The results are presented in detail in Appendix II. The coefficients of association between unemployment rate and those explanatory variables are presented in Table 7.7. The link between unemployment rate and age of people in labour force as shown by the degree of association is the highest and it is clearly consistent with other research findings. Other variables indicated lower degree of linkage.

In the logistic regression model, a maximum likelihood ratio; 1.000 indicates a very good fit. The coefficients of almost all these variables are significant as shown in Table 7.8a and b. In the

**Table 7.7**

**Coefficients of Association of Unemployment Rate**

Covariates	Coefficients	Chi-Square
Age-Group	0.448	18223.027
Marital Status	0.391	13825.901
Education	0.177	2825.744
Gender	-0.139	1752.866
Migration	0.103	963.069

general linear model, ordinary least squares reveal that the model succeeded in explaining 27% of the variation in unemployment rate. R-square is 0.27 as presented in Table 7.9. The coefficient estimates of almost all the variables are also statistically significant. The results are presented in detail in Appendix II.

Logistic regression model indicates a very good fit in describing national unemployment rate function by the given variables included in the model. R-Square in the general linear model reveals a reasonable result taking into account the absence of other essential economic variables e.g. wage and income. But it can be said that all the results generally are good. The remainder of this part is concerned with the analysis of the effect of each variables on national unemployment according to the likelihood method of estimation as presented in Tables 7.8a and b.

Age group parameters for the main effect show that when controlling all other variables in the model, the estimated logit of the unemployment rate in the age groups (15-19) increases by the significant amount of 1.8381 and by the amount of 0.6819 for

**Table 7.8a**  
**Unemployment Logistic Model**  
**Estimation of the Main Effects**

<b>The Covariates</b>	<b>Parameter Estimates</b>	<b>Standard Errors</b>	<b>Chi-Square</b>	<b>Prob &gt; Chi-Square</b>
<b>Intercept</b>	-2.0074	0.1130	315.83	0.0000
<b>AGEG:</b>				
15-19	1.8381	0.0869	447.23	0.0000
20-24	0.6819	0.0796	73.32	0.0000
25-29	-0.2713	0.0799	11.53	0.0000
30-59	-0.9436	0.0800	139.30	0.0000
<b>Sex:</b>	-0.2616	0.0890	8.65	0.0033
<b>MRTS:</b>				
Single	0.9915	0.0524	357.73	0.0000
Married	-0.6408	0.0517	153.55	0.0000
Divorced	0.3155	0.0754	17.50	0.0000
<b>PEREXPAPAT</b>	0.0289	0.00120	5.83	0.0157
<b>EDUCAT:</b>				
Primary & Below	1.1267	0.0802	197.57	0.0000
Preparatory	0.6725	0.0655	105.56	0.0000
Secondary	0.5354	0.0652	67.45	0.0000
Above Secondary	-0.1370	0.0993	1.90	0.1677
University	-0.5236	0.1703	9.46	0.0021
<b>SPGM:</b>				
Secondary Level:				
General	0.4437	0.1038	18.28	0.0000
Medical & Treatment	0.0549	0.1071	0.26	0.6084
Miscellaneous	0.4636	0.1087	18.18	0.0000
Above Secondary:				
Business & Accounting	-0.0427	0.03081	0.02	0.8899
Trade & Industry	-1.0394	0.4694	4.90	0.0268
Humanities & Natural Science	-0.4975	0.3201	2.41	0.1202
Medical & Treatment	-0.3339	0.2236	2.23	0.1354
Engineering	-0.0189	0.2658	0.01	0.9434
Education & Teacher Training	-1.1789	0.2730	18.5	0.0000
Miscellaneous	0.0269	0.2356	0.01	0.9090
University:				
Trade & Industry	-1.0408	0.3965	6.89	0.0087
Humanities & Natural Science	0.1572	0.2585	0.37	0.5433
Medical and Treatment	0.8244	0.2447	11.35	0.0008
Engineering	0.5723	0.2574	4.94	0.0262
Education & Teacher Training	-0.2177	0.3501	0.39	0.5341
Miscellaneous	0.3867	0.2657	2.12	0.1455

**Table 7.8b**  
**Unemployment Logistic Model**  
**Estimation of the Interaction Effects**

The Covariates	Parameter Estimates	Standard Errors	Chi-Square	Prob > Chi-Square
<b>AGEG*SEX:</b>				
15-19	-0.5675	0.0869	42.62	0.0000
20-24	-0.3976	0.0796	24.95	0.0000
25-29	-0.2520	0.0799	9.95	0.0016
30-59	0.2765	0.0799	11.97	0.0000
<b>MRTS*SEX:</b>				
Single	-0.1488	0.0524	8.06	0.0045
Married	-0.3023	0.0517	34.18	0.0000
Divorced	0.1731	0.0754	5.27	0.0217
<b>EDUCAT*SEX:</b>				
Primary & Below	-0.0838	0.0607	1.91	0.1673
Preparatory	-0.2375	0.0422	31.61	0.0000
Secondary	-0.2264	0.0419	29.21	0.0000
Above Secondary	0.0789	0.0279	7.99	0.0047
University	0.1714	0.0586	8.57	0.0034

**Table 7.9**

**Unemployment General Linear Model**

Employment Mean	0.147708
Root MSE	0.303802

R-square	F-value	Prob > F
0.2672	785.25	0.0

**Analysis of Variance**

Source	Sum of Squares	Mean Square
Regression	3043.950	72.4750
Error	8347.777	0.09929

persons in the age group (20-24). But it decreased by the amount -0.2713 and -0.9436 for persons in the age groups (25-29) and (30-59) respectively. Sex parameter for the main effect shows that controlling for all other variables in the model the estimated logit of unemployment decreases by a significant amount of -0.2616 for males. Conversely, it increases by the same amount for females.

In terms of interaction effect, evidently sex effect is not the same in all age groups. The estimated logit of unemployment decreases by the significant amounts of -0.5675, -0.3976 and -0.2520 for males in the age groups (15-19), (20-24) and (25-29) respectively. Nevertheless, it increases by the significant amount of 0.2765 for males in the age group (30-59).

Marital status parameters show significant results. Married people decrease the logit of unemployment rate by -0.6408. On the other hand single and divorced people effects exert in reversal way, they significantly increase the logit of the unemployment rate by 0.9915 and 0.3155 respectively. The results of the interaction procedure reveal that men, both married and single, have a negative sign while a positive sign for women. Divorced and widowed women are more likely to work, but the coefficient is not significant. For women the situation is partially differentiated by the impact of illegitimate barriers not seen by employers including Government as affecting the efficient working of the labour market. For example less opportunities and less offers to women compared to those for men. For more detail see Kaiksow [99] "Female Labour Supply". Education variable coefficients indicate significantly that people of low level of education (primary and below, preparatory and secondary levels) are contributing to increasing the logit of unemployment rate. The interaction coefficients of both variables, education and sex, shed more light on this finding. It indicates that

males of low levels are significantly contributing to decreasing the logit of the unemployment rate.

Immigration variable (PEREXPAT) effect on national unemployment showed a positive trend. The coefficient estimate indicates that the amount of increase in the logit of the unemployment rate is 0.00289 per unit increase in the percentage of the expatriate workers. The result potentially confirms researcher findings and prospect in earlier work [99]. Although there has been an immigrant competitors against Bahraini natives, but, at some specific occupations this competition is insignificant in Bahrain's labour market.

In terms of specialization or occupational choice of individual educational attainment it is found that by keeping other variables in the model constant, specialization groups of lower level of education increase the logit of unemployment rate. People of this level are more likely to be exposed to unemployment. This result seems normal, as at this level, teenagers are mostly unqualified. The estimated logit of the unemployment rate at this level increases significantly. But, by looking at the interaction effects of both education and gender variables, we find that the logit of unemployment rate in this group decreases significantly.

At the above secondary level (equivalent to A level or higher) the coefficient estimates indicate negative signs for almost all specialization groups except for miscellaneous. Those specialization groups or occupational related groups (which include Business, Humanities, Mathematics and Computer, Social Science, Natural Science, Engineering and Medical programmes) may decrease the logit of unemployment rate if only demand for these occupations in the labour market is in excess of supply or at least

equal to it. The coefficients of those covariates are insignificant except for Education and Teachers Training, which significantly decreases the logit of unemployment rate by the amount of -1.1789.

This means people joining Teachers' Training courses are more likely to find jobs. Also looking at the interaction effects of both education and gender, we find that the logit of the unemployment rate increases in the male group by the amount of 0.0789, but is not at a comfortable level of significance. The parameters attitude of the occupational choice at the high level of educational attainment indicate different signs. Although Trades and Craft and Industrial programmes variable indicates a negative sign, it is statistically insignificant. The Medical programmes parameter is significantly positive by 0.8244. Education Sciences and Teacher Training programmes exert a negative effect on the logit of the unemployment rate, but it is not significant. Jobs for those groups do not absorb all people graduated from those courses any more. The remaining groups at this high level indicate a positive effect but is not significant. However, these occupational choice groups (including Medical, Humanities, Social Science, Business and Accounting, Natural Science and Mathematics, Computer Science and Engineering programmes) may increase the logit of the national unemployment rate. Comparing this result with the interaction coefficient of both education and gender, we find that males of this group increase the logit of the unemployment rate by 0.1714.

Finally, the results confirm that there is an inverse relationship between unemployment and vacancies and that labour supply is in excess of demand in Bahrain's inefficient labour market. Having examined labour supply and unemployment problems, I intend to embark on an evaluation of some relevant policies which are considered in the following chapter.



## **CHAPTER EIGHT**

### **Unemployment Policies**

#### **Introduction**

In order for this thesis to be of greatest use to policy makers, this chapter presents the essential unemployment policies based on the main economic theories. The many alternative explanations of high unemployment mentioned in the previous chapter are taken into consideration, and an important distinction is made between the natural rate of unemployment and unemployment in excess of that rate. Classical economists suggest that later unemployment is a random occurrence requiring no government intervention and generally, the labour market, like other aggregate markets will be in equilibrium. On the other hand, the disequilibrium approach implies that non-natural unemployment can exist and persist, and so requires corrective action by the government, although the form of that action depends upon the causes of this unemployment.

#### **8.1 Market - Clearing Approach and Natural Unemployment**

According to the new classical approach, the economy is in equilibrium when its three market sector are cleared, or at their natural level: real wage, interest rate and price level. When the economy is in equilibrium there is no involuntary unemployment. Since the demand and supply of labour are equal, unemployment is at its natural level, and those voluntarily unemployed are because the real wage is either too low or too high.

What happens in the case of disequilibrium in the labour market and can this give rise to non natural unemployment? For example, suppose the current real wage is higher than its equilibrium level, labour supply would

exceed labour demand. In this case there would be unemployment in excess of the natural rate. Would this rate persist? The classical market clearing view is that it would not persist if market forces operate. In this case the presence of excess supply of labour would drive back the money wage and the real wage at its equilibrium which would be restored. Only if there are impediments to this process, would this unemployment be instantaneously eliminated. The only thing a government could do is to eliminate these impediments. If it used an expansionary fiscal policy to remove the non-natural unemployment, any extra expenditure would simply crowd out existing expenditure and leave the demand for goods unaffected.

Monetarism believes that in such circumstances if government increased the money supply this would cause an increase in price level. If money wages stayed at a disequilibrium level then real wage would fall and move the economy back to equilibrium. If on the other hand money wages rose as a response to price increase then monetary policy would be futile as its fiscal policy.

It is more appropriate that fiscal policy should be concerned with the elimination of unemployment while monetary policy should be used to ensure that external balance is maintained, or secured when necessary. In fact in a fixed exchange rate economy the traditional keynesian non market-clearing approach is strengthened.

## **8.2 Economic Policy and Non-natural Unemployment**

As we have mentioned, new classical economists believe that demand management is neither necessary nor effective. This belief rests on the assumption that expectations are formed rationally and that markets in the economy continuously clear. For example; Sargent [149] tested whether

in practice economic policy changes are neutral unless they take the private sector by surprise. He found that money supply and nominal money wage do not significantly affect unemployment, and suggested that neither did demand management. Anderson and Jordon [5] found that although fiscal policy changes had little effect on output, unemployment monetary policy changes had a significant impact. Espinosa and Russell (1996) in a study integrated the model of neoclassical production and capital with a model of monetary policy to measure its effects on output, and concluded that a permanent easing of monetary policy implemented by open market sales or by decreases in the required reserve ratio, increases the rate of inflation and decreases the real interest rate. The decline in the real interest rate produces a permanent increase in the level of output, but ultimately temporary increases in the growth rate of output. Under these conditions they suggested, the ratio of the increase in the real interest rate to the associated decrease in the inflation rate can become quite large, which means the effects of monetary policy on real interest rates and output can be strong in relation to their effects on the inflation rate. In other words, monetary policy can have substantial real effects.

Others like Artis and Nobay [12] undertook similar tests to those performed by Anderson and Jordon and found different results. Not only did fiscal policy exert a significant impact on output and employment, but monetary had little, if any, effect. Andres and Nickel [6] came to a similar conclusion. One explanation may be that the channels of monetary influence are weak in some countries compared with other countries. The conclusion from this evidence is that both fiscal and monetary policy influence real output and employment.

In fact the position of the new classical economists is more subtle than that of the traditional monetarists like Friedman. New classical economists do not deny that policy changes influence the real sector of the

economy but they argue that these changes must not be anticipated by the private sector. If the policy change is known in advance its effects are predicted and discounted so that no real changes take place. For example, Barro [26, 27, 28, 29] and Barro and Munnich [30] tested this hypothesis by distinguishing between anticipated and unanticipated changes in policy instruments. Similar work had been conducted by Demery [53]. Most empirical studies found that only unanticipated monetary changes can affect unemployment. This is consistent with the classical perspective on unemployment, i.e. that demand management will only have an effect as long as the private sector can be fooled. It is worth saying that this view also suggests that the costs of such a policy will be increases in the price level and in the rate of inflation.

As far as fiscal policy is concerned, Attfield, Emery and Duck's work also provides some insights. They used governments' borrowing requirements, which could be interpreted as an unanticipated expansionary fiscal policy, which is associated with an unanticipated expansion in the money supply. Consequently, the problem arises that if unanticipated changes in policy have real effects, it is not clear whether fiscal or monetary changes are ultimately responsible. In this respect Andres and Nickell [6] indicate that unanticipated increases in government's spending do reduce the unemployment rate, so fiscal surprises may work as well as the monetary equivalents. This has been confirmed by Pesaron [140] regarding the neutrality of demand management. He indicates that the Keynesian and classical alternatives are both strong, with no clear superior. Also it could be inferred that the lack of strong policy evidence provides indirect support for the superiority of a non market-clearing approach to unemployment and of the consequent existence of positive and persistent non-natural unemployment.

### 8.2.1 Demand Management Policy

In fact, as we have seen, there is a sound theoretical and empirical case for believing that the rise in unemployment in most industrial and developing countries is partly non-natural in character. During the 1970s most economists viewed unemployment as principally the outcome of controllable fluctuations in aggregate demand. So Keynesians claim that management policies should be sufficient to eliminate the problem, particularly through the use of fiscal instruments.

The experience of the 1970s in most industrial countries has led many economists who accept the need for a demand expansion in order to reduce unemployment to argue also for the use of an incomes policy to supplement and support this kind of demand management, as well as the creation, of trade, and the diversion of instruments such as import controls or currency depreciation, because of the persistent difficulty in achieving both internal and external balance. Taking Britain as an example, because of the persistence of a high unemployment rate since the early 1970s, government policy managed to reduce this high rate by expanding the aggregate demand for goods, cutting taxes, increasing public investments and expanding the money supply. These are the instruments of keynesian demand management policy assuming that unemployment was largely keynesian. The only departure from this diagnosis was the emphasis placed on regional incentives to reduce “structural” unemployment in certain areas of Britain. In the 1980s much has changed in many industrial countries including Britain, partly as a result of the rise to power of politicians of the right who have some ideological sympathy with the modern classical economics. However eclipse of demand management and

re-emergence of classical economic ideas have influenced even governments in other parts of the world.

In the State of Bahrain, the need to control the public sector borrowing requirement and the money supply became an important objective of economic policy since the mid 1980s, which took the form of cuts in public investment and spending. In general this policy has rejected the notion that a reflation of demand via increases in current public spending or public investment is a viable solution to high unemployment, on the contrary, it considers that too high a level of real wages is a major cause of natural and non-natural unemployment. Implicit in this policy is the belief that most non-natural unemployment is classical in character and can be remedied by real labour cost reduction. (c.f. the next chapter for evidence of this policy). One means to this end is to reduce the disincentive to hiring, which new classical economists believe to be an important feature of structural unemployment. Classical economists do believe that real wages need to fall if equilibrium employment is to be increased. Theoretically this is not an obvious requirement, but in practice, labour demand should be sufficient to increase both employment and real wages, as was the case in Bahrain at the beginning of the 1970s (see Chapter Three for evidence of this).

### **8.3    Unemployment Policies**

**8.3.1** As fiscal policy and demand management, in terms of Bahrain experience, involves tackling unemployment, the evidence suggests that both of these policies were not directly targeted at maintaining a low unemployment rate in the mid 1980s which has contributed to the first rise in unemployment rate.

On the other hand the government's fiscal stance and the high money supply had a profound effect on the level of employment in Bahrain. What happened in fact is that the impact of other aspects of policy has clearly offset the demand management effect since 1979. These other aspects are firstly, the relaxation of the policy on foreign labourers, when the number of labour licences issued for non-Bahraini went up by 51% from 1986 to 1987. These licences continued to rise over the 1980s and early 1990s until they reached a peak in 1992, of 59,746 corresponding to an increase of almost 186% in relation to 1986. Secondly, another aspect is the reduction in the inflation rate, which helped both trade competitiveness and private consumption, which rose when a ceiling rate on consumer loans was reduced from 15% to 12% effect rate between 1988 and 1992, with a rising of maximum loan limit from BD 20,000 to 40,000.

Obviously, this boost in private consumption would not have occurred had consumer credit not become more readily available. Then if this is the case, the relaxation by the government of the stringency of credit control since 1988 is more important as a complementary factor than the direct effect of the reduction in the inflation rate. Whatever the cause, both private consumption and trade competitiveness partially offset the reduction in aggregate demand occurring through previous fiscal stringency. In this regard it is worth considering the negative impact on private consumption presented by non-Bahraini workers remittances out the country which amounted to US\$ 432m in 1996. However, as a result of the boost to trade competitiveness export volumes rose, which increased both output (especially in manufacturing) and employment.

Other policies adopted in Bahrain in an attempt to restrain the growth in real wages were the restraint of the public sector, and the abolition of the earnings related supplement, i.e. a cut on some allowances which are given strong emphasis in the classical view of unemployment.

**8.3.2** In general terms, other policies to generate equilibrium employment, especially via the industrial sector, include:

- I Giving help and incentives to enterprises, especially small and medium-sized firms.
- II Supporting the exportation and exploitation of new technology.
- III Easing the burden of regulations and simplifying the planning system.
- IV Breaking up monopolies and fostering competition.
- V Releasing as much business as possible out of public sector constraints into the challenge and opportunity of a free commercial setting.

In the State of Bahrain, where some of these policies were adopted throughout the 1980s, there is no clear cut evidence that their implementation had a profound effect on the rate of national unemployment. Despite the government's emphasis on the Bahrainization of jobs, the number of registered unemployed and job seekers has been increasing since 1989. The government addressed the accelerated rate of growth in manufacturing via the



international competition in this sector. In fact labour productivity growth has not accelerated although it remains high compared with other sectors in the economy. Generally, we have seen no acceleration to the secular rate of labour productivity, which would increase both equilibrium employment and real wage and so bring the natural rate of unemployment back down to the levels of the early 1980s, appears to have taken place in the 1990s. Rather low productivity compared with other industrial countries, as referred to in the earlier chapters, has actually caused a reduction in equilibrium employment in comparison with the level in the early 1980s and so increased the natural rate of unemployment. (More with prospects in the next chapter).

**8.3.3** Other fiscal policies to reduce the rate of unemployment that could be adopted through government intervention in the labour market includes:

- I      wage subsidies.
- II     training programmes
- III    job-sharing, and early retirement programmes
- IV    public employment programmes

#### **I - Wage Subsidies**

There has been much debate about the advantages and disadvantages of this instrument. Some economists regard it as a remedy of the failure of Keynesian macroeconomics policy for stagflation and slumpflation. Generally governments turn to job subsidisation as a means of promoting or maintaining employment,

whereby employers are given a subsidy for every employee especially young workers under 19 years old and the long-term unemployed during the first year of their employment. In the State of Bahrain there has not been any experience in this regard, instead, the Bahrain government has recently started to increase the incentives towards Bahrainisation of jobs in the private sector by tightening legislation on the importation of foreign workers.

In Britain for example, this scheme had a great success in recruiting about a third of the relevant age group between the years 1982 to 1986. According to Burton [40], the employment subsidies policy has been advocated on two grounds. First, that these measures not only reduce unemployment but also simultaneously reduce the rate of price inflation and the extent of the public sector funding requirement, especially for countries that have adopted unemployment benefit. Second, that governments have subsidised capital rather than labour through investment grants and other devices. Hence subsidies to labour offer a means of rectifying a misallocation of resources created by previous policies. On the other hand economists argue that although a job subsidy is capable of increasing or maintaining employment in firms within its jurisdiction, the more fundamental question is whether it has a positive effect on unemployment as a whole. In fact it has been suggested that any subsidy can have only a limited impact on domestic demand.

The principal effect is via prices, and prices cannot fall below the average costs of the marginal firm. Accordingly, since the responsiveness of aggregate demand to changes in price is low, the effect of any subsidy upon domestic demand is relatively small. Aggregate employment in an industrial sector will rise only to the

extent that average cost has fallen as a result of the marginal subsidy.

But the existence of employment in subsidised firms occurs at the cost of jobs lost in non-subsidised firms. This has been regarded by economists as a distortion of labour costs structure in an economy. A further limitation of a job subsidies policy is that it might become a feature in the fiscal sense, and such pressures could result in a long-term programme of support. Once the government starts to spend extensively and predictably on job subsidies, workers and firms will begin to formulate expectations that undermine the effectiveness of the measures.

## **II - Training Programme**

Generally, training programmes are important especially for young workers. Although they are potentially intended as a means of reducing unemployment, greater emphasis has been placed on the pure training component of the policy. The purpose is to provide a better qualified workforce. In the long run this policy, by affecting overall economic performance, including the level of labour productivity, should reduce the natural rate of unemployment.

In the State of Bahrain, a great deal of effort has been put into training programmes as a structural measure towards the “Bahrainisation scheme” for the period 1989-1994. The emphasis has been placed on the pure training component rather than as a means of reducing unemployment.

The principal aim of the Bahrainisation scheme was the creation of 20,000 job opportunities for Bahrainis entering the labour market for the first time during the period 1989 to 1994. In order to

achieve this aim, emphasis has been placed on providing the necessary training opportunities for certain occupations which should be accepted by Bahrainis and are more suited to their nature. On the other hand the implementation of the 'Bahrainisation scheme' should not damage the effectiveness and competitiveness of the national economy. An assessment of the demand size, or the number of occupations by non Bahrainis which should be replaced by Bahraini workers was performed by a commissioned committee formed for this purpose, revealed that the private sector employed 60% of the workers engaged in these occupations. This indicates that the 'replacement process', via the Bahrainisation scheme, would focus on private sector firms employing ten workers or more, on the assumption that labour productivity would remain unchanged.

One of the useful recommendations of the committee was to study the possibility of setting up special projects for ensuring the intensive employment of women, because the Bahrainisation scheme revealed that there were no suitable job opportunities for women. Further, the committee recommended the development of some existing vocational training centers for example, the conversion of the Hotel and Catering Training Center into a college with a greater capacity for trainees, Bahrainis having shown a limited interest in hotel and catering jobs, and these jobs being consequently held by foreigners.

Generally, all courses have been provided at publicly owned skill centers and colleges, courses typically lasting from a few months to a year or more. According to 1993 figures the ratio of drop-outs was almost 44 percent of total trainees.

### **III - Early Retirement**

Early retirement is generally considered by many governments as a labour market instrument during recession. Currently in the State of Bahrain a new emphasis has been placed on a proposal for an early-retirement scheme. So far early retirement schemes have been introduced by large firms e.g. BAPCO and Gulf Air, the aim of the scheme being to reduce costs of labour. Although it is not compulsory many members of staff are being asked to benefit from it, the scheme providing a full wage, with all benefits such as medical entitlements and air tickets for the first five years before the normal pensions applying at age 60, staff who have worked for their firms for 20 years are eligible for this scheme. Under a special arrangement the General Organisation for Social Insurance will pay 44 percent of the wage and the firms will pay the rest.

### **IV - Public Employment Programme**

There are other types of schemes which have provided public employment for the unemployed. In the State of Bahrain recently the Modern Craft Industries Centre was established by the Ministry of Oil and Industry, one of the objectives of this project being to create job opportunities for Bahraini youth. At the beginning of this project in 1991 a special training programme was carried out by the Ministry of Oil and Industry in coordination with the Ministry of Education, until 1993, when the latter became fully responsible for such training programmes. The project's central feature is to enhance some cultured craft industries by encouraging unemployed youth to participate in opening up their own businesses in the Modern Craft Industries Centre. But lack of effective incentives to those entrepreneurs; i.e. subsidies or an allowance scheme to help them keep going has created long term difficulties. (Alternative policies and prospects are dealt with in the next chapter: Conclusion of this Thesis).

## **CHAPTER NINE**

### **Conclusion**

The results of this thesis confirm the results of other studies of life cycle labour supply, showing that labour supply estimates react quite sensitively to economic and stochastic assumptions. In the econometric model, we found that for our groups, changes in participation status in response to wage changes are almost identical. Despite the difference in risks and preferences, it apparently supports a less flexible response to wage change. The elasticity of participation with respect to the wage change is rather low for both groups; Bahraini and non-Bahraini. For secondary workers, the participation with respect to wage change is inelastic. Also in the aggregate model, the participation with respect to wage change is inelastic. Moreover, the transitory labour supply elasticity is either negative or positive, but small. However, the results revealed firstly, a general trend of excess labour supply, particularly by Bahraini groups over equilibrium and disequilibrium labour market. Secondly, the predominance of the relative wage theory in the models. Thirdly, the prevalence of inefficient wages in the labour market. Fourthly, a trend of increase in natural unemployment in groups particularly between the ages of 15 and 19 and females, which exhibit higher equilibrium levels of unemployment, and finally, the existence and persistence of non-natural (disequilibrium) unemployment in Bahrain's economy due to a very slow market-clearing process.

The results support a case for the inclusion of these variables in the labour supply model: the permanent wage, the relative wage, the aggregate unemployment rate, the inflation rate and trend.

The results add support to a labour market model along neoclassical lines based on two facts: firstly that labour supply is largely a function of real wages, secondly that it responds to an inflation variable.

The results also support conclusions which are not generally included in neoclassical labour supply function theories. Firstly, the model has found good evidence of the responsibility of variation in labour demand for variation in labour force. Labour supply as a function of unemployment in a slump economy shows added worker effect for almost all groups, due to the increase of unemployment stock. Secondly, a relative wage effect rather than the more traditional permanent wage effect explains the labour market behaviour of some primary and many secondary workers. Finally it should be recognised that inflation may serve as an indication for labour market conditions.

The results have confirmed an important issue in terms of the characteristics of the unemployed age being, among other factors, a possible problem, low educational attainment and low or no skills among secondary workers, long period unemployment and the debilitating effect on skills, aptitude, motivation and acceptability for work among some primary workers, causing their structural unemployment. Other important factors constituting possible problems are specialization (occupational choice) and educational attainment of people entering the labour market for the first time. The results support the Beveridge Curve in terms of the relationship between unemployment and vacancies. It appears that although the demand for labour in Bahrain's labour market rose through the boom, the unemployed seemed inappropriately equipped or located to fill the jobs that were emerging.

The results support the findings of many other research in terms of work discrimination against females.

The results have remarkably showed that labour supply of Bahraini secondary workers is partially competed by foreign workers in the labour market. On the other hand the results revealed that labour supply is partially subject to other un-measurable variables such as taste, and not only to external circumstances such as labour market conditions.

This conclusion, in the light of the findings in this thesis, in which unemployment policies have been considered, will suggest and discuss prospects for alternative policy initiatives that might be adopted to reduce unemployment in Bahrain. As we have noted in the previous chapter, the evidence broadly favours the adoption of a non market-clearing approach which confirms that non-natural unemployment can exist and persist. In principle unemployment may rise, both because of too high a level of real wages as well as a reduction in the level of aggregate demand for goods. In the State of Bahrain the evidence resulting from labour supply models in Chapter Six suggests that the former cause was not valid while the latter was more important in the last decade. The government has been seeking cuts in real wage growth since the last decade; such a policy does not, of course, necessarily rely on disequilibrium argument; from a classical equilibrium perspective real wage cuts are also necessary to ensure a reduction in the natural rate of unemployment.

There has been an argument in the 1990s that firms face no long-run quantity constraints in the market for goods and services, and the resulting unemployment is natural in character. With excess labour supply resulting from added-worker effect in the labour market for almost all groups, Bahrainis and non-Bahrainis, primary and secondary workers, which is a feature of the aggregate labour market (c.f. labour supply models in Chapter Six ) we argue the assumption that full employment can be explained mostly in terms of factors determining labour demand has become valid. This means that there is substantial non-natural unemployment, or in other words involuntary unemployment which requires corrective action by the Government. This is consistent with keynesian unemployment.

In terms of the economy, prospects of regional classical economists were that the 1990s would be more promising than any time since the onset of the recession in 1983 throughout the Gulf countries. Signs of renewed economic growth in 1990 were somewhat evident. Bahrain's GDP growth rate was 9.6%, almost the



highest since recession. Oil GDP growth rate was 39.7%, the highest since 1975. With the rising oil revenue, it reached 61.6% of total Government income, the highest since 1986 when oil prices had declined to \$13.5 per barrel. But looking beyond 1990, we found the picture completely different, in fact discouraging. GDP growth rates have declined and continued declining. GDP growth rate declined to 2.4% and 2.2% in 1994 and 1995 respectively. Oil GDP growth rate declined to -2.8% in 1994. Perception that the 1990s would be more promising was rationally due to a rise in oil prices when it reached an average of \$22.2 per barrel following the Gulf War.

There are four important main factors that regional classical economists regarded as positive signs in 1990 and as bound to create some promising changes since the beginning of the recession in 1983. Firstly, the return of confidence in the Gulf markets would translate into expansionary business and investment, relaxed consumer spending patterns, reduced the need for cost cutting and upturn in employment opportunities. Secondly, secured oil revenues would make it possible for the Government to implement their targeted expansionary budgets, thus giving added boost to domestic economic growth. Thirdly, capital market activities would pick up with stronger bond markets and intensified privatisation efforts as more national and foreign institutions chose to increase their capital base through share floatation. Lastly, higher commercial profits of banks benefiting from stronger domestic activities, would surge in deposits and in a reduction in loan provision due to a continuing uptrend in shares and real estate prices.

The research argues the validity of these factors in the light of some economic indicators through the 1990s. Despite the emphasis of Bahrain government policy on factors that attract banks and companies (such as Except Company registration (EC), which enabled companies to incorporate in Bahrain without a Bahraini share holding) growth rates of the finance and real estate services sector has sharply declined, it reached 0.9% in 1991 and -0.8% in 1994. Also GDP growth rate of trade has dramatically declined to -1.8% in 1993. Other evidence is the

establishment of Bahrain Development Bank in 1992 aimed at supporting domestic private investment in small and medium-sized industries, and at closing a major gap left by commercial banks in the provision of long-term credit for domestic projects.

In terms of government budgetary stance, it has deteriorated due to low oil prices and increased defence expenditure. Budget deficit which has been financed through placement of bonds and short term treasury bills with banks and pension funds shot up to 71.8 in 1992 and to 130.2 in 1994. Recent improvements in 1996 are partly a consequence of Saudi Arabia awarding Bahrain its 50% share of the revenues from the Abu Safa oil field (owned 50/50 with Bahrain). These increased oil revenues have underpinned government expenditure plans.

Given the previous discussion, it is evident that forecasts made by classical economists regarding the promising years in the early 1990s are not valid.

Generally, classical economic analysis has always emphasised the role of the market forces in attaining full employment through real wage cuts. In fact, the evidence through this century suggests that market mechanism alone is unlikely to bring about the adjustment of real wages needed to secure full employment. In fact real significant wage reductions to reduce unemployment have to be considerable and therefore difficult to achieve in practice. The argument is that the relationship between labour productivity and the wage paid is positive. Labour productivity is maximised at the efficiency wage, which minimises costs per unit of labour employed. As a result, if a firm's wage is above the market-clearing wage, the firm will not cut the wage to permit the removal of excess supply, and involuntary unemployment will therefore take place.

Instead this research suggests that the most obvious alternative policy is to use demand management instruments to reduce keynesian non-natural unemployment. As we have seen there has been evidence that reduction in

aggregate demand is the most potent cause of the rise in unemployment since the mid 1980s. Firms are constrained by a deficiency of aggregate demand and so there has been a consequent substantial non-natural keynesian unemployment. The argument is that the equilibrium level of aggregate demand determines the level of output and the effective demand for labour. If the effective demand is less than the actual demand this means it is not sufficient to employ all the labour that is willingly supplied. So the level of wages no longer determines the volume of employment, employment is determined by aggregate demand and any resulting unemployment will be associated with involuntary unemployment. This means that unemployment can result from causes other than excessive wage rates. Indeed, if policy were based on the assumption that unemployment were due to excessive real wages, it would lead the economy entirely in the wrong direction. Because this policy would cause further reduction in consumption and the level of effective demand, which in turn would cause reduction in the amount of output that could be sold. The solution to keynesian unemployment is not to reduce wage rates but to increase the level of aggregate demand. If this is the case a major demand expansion is required and this could significantly reduce total unemployment. These instruments are available to the government. Increases in public investment, or current expenditure and a relaxation of monetary controls are the principal alternatives.

The increase in public investment is considerably more costly than the increase in current expenditure, because of technical complexity and capital intensity increases in capital investment (i.e. in the industrial sector). Also, there are exceptional circumstances when increases in current expenditure are higher than increases in public investment, especially when defence expenditure is unusually high, but in general, increases in current expenditure are always a less costly and more effective than other instruments in reducing unemployment. In this respect, considering the period from the mid 1970s until the mid 1980s, most current government expenditure was on labour intensive increases, therefore had an immediate and substantial effect on employment. Imports and saving leakages

may reduce secondary spending increases, but have no effect early on in the first stage of the process. Although more costly, increases in public investment are also effective if a substantial proportion of total public investment is domestically produced. In terms of their direct employment effects, current public expenditure increases were the most effective in increasing jobs, from the 1970s until the mid 1980s. But despite the intensive increase in capital expenditure at the beginning of 1980s, the increase in jobs is extremely modest. Of course this is not the only consideration in choosing between current and capital public expenditure. The latter has a much greater impact on private sector employment. However, both instruments according to economists view, are generally more effective than any income policy as a way of stimulating demand in order to reduce non-natural unemployment caused by deficient demand for goods and services that has dominated Bahrain's economy.

However, recent expansion in government spending facilitated by Saudi Arabia's award of its share from the Abu Saafa oil field is evidence that confirms the research findings and suggestions as to alternative economic policies needed to drive the economy towards increasing employment of nationals. Obviously Bahrain's government has chosen increase in public investment rather than increase in current expenditure as an instrument. The Hidd project, which is a major industrial park and one of the cornerstones of short-term industrial strategy is an example. Also Hidd-Manama bridge, which will link the industrial park to other industrial and commercial centres in the archipelago. This instrument has a great impact on increasing private sector employment. The government is clear in its view that the private sector must be provided with the right conditions to allow it to flourish. Currently, the main driver of economic growth in Bahrain is government spending, but this is a situation which the government plans to change in order to broaden the means of economic earnings. To do so, the private sector is being encouraged to form joint ventures with international partners. Recently, as part of government strategy to diversify the economic

bases, an expansion of the tourism sector, with an aim to making Bahrain the leisure centre of the Gulf, appears to be one of the long-term industrial policies.

On the other hand, the need to control public spending and the borrowing requirement with the objective of decreasing national unemployment, means the intention of the government is to encourage the private sector to increase its investment in the tourism sector as quickly as possible. As we have mentioned in the previous chapter, this policy has implicitly rejected the notion that a reflation of demand via increases in current public spending or public investment is a viable solution to high unemployment. Rather, it has maintained the view that too high a level of real wages is a major cause of natural and non-natural unemployment. Such a policy has implicitly believed that most non-natural unemployment is classical in character and can be remedied by real labour cost reduction. In other words, that the solution should be left to market forces. This is based on the fact that while the government is committed to the growth of the leisure industry in Bahrain, it must have noted that prospective Bahraini employees in this sector may not accept wage levels that are established below their expectation.

The research argues the assumption underlying such a policy, which is not compatible with industrial policies that reject the classical view of the capacity of market forces to bring about spontaneously the kind of structural change required to achieve a permanent reduction in equilibrium national unemployment. Instead, the research suggests either a subsidy taking into account the advantages and disadvantages of this instrument or national social insurance relief for those prospective workers. The General Organisation for Social Insurance is financially capable of being relied on. (Further details will follow).

Our concern here involves dealing with non-natural or structural unemployment. The assumption on which these alternative policies are based is that in the tourism sector policies involve dealing with structural changes either on the

production process or on one of its components. Prospective workers in this sector would be either inflow from unemployment, and possibly structural unemployment, or graduates of the public training programmes, specifically “the Hotel and Catering Centre”. So in this case the most viable course of action for market forces is to moderate wages.

What is left to be said is that if Manama is to remain as a prominent financial and leisure centre in the Gulf, the government may take a more proactive role in creating the right conditions for maximum provision of national employment. Civil disturbances have cast a shadow over the changing economic conditions over this decade, and while some believe that these disturbances may be instigated from outside the country, research based on Chapter Seven suggests it is more likely that the dissent is genuinely and purely directed at the policy as a consequence of unemployment depression, to bring a solution to increased national unemployment.

However, there are problems involved in any demand expansion, the most frequently emphasised being the worsening of the balance of payments for example, Bahrain’s deficit resulting from capital expenditure increase in the mid 1980s.

In fact advocates of demand expansion usually argue for demand side expenditure, changing policies like import controls to deal with this. Also there has been argument for supply side industrial policies to generate net exports, which are of more relevance to the long term. Others argue that higher interest rates to attract a capital account inflow to offset any current account deterioration are necessary in the short term. The problem with this is that high interest rates may crowd out some private sector spending, reducing the impact of the demand expansion.

However, awareness must be present to ensure that these effects are not substantial enough to make significant barriers to the unemployment reducing effect of a demand expansion. There is a need to adopt one or all of these policies to ease the adverse effect on the balance of payments that will result from a demand expansion. This problem worsens when the demand expansion policy is a unilateral one. Unless other countries are simultaneously adopting similar policies, domestic imports rise much faster than exports. The consequent deterioration in the balance of payments position could be dramatic.

Given the problems that result from a unilateral demand expansion, there is obviously a strong need for an internationally and regionally coordinated system. Clearly, however, if an increase in aggregate demand is thought necessary to reduce non-natural unemployment in Bahrain, the probability of its success will be greatly enhanced through a regionally coordinated system.

A further and associated problem is the impact of demand expansion on inflation for example, the high inflation rate recorded during the boom years of the 1970s and early 1980s. Some economists believe high inflation dampens to a substantial extent both domestic and foreign demand for goods.

In conclusion, real wage cuts and demand expansion can both, in principle reduce non-natural unemployment. The impact of the former is slight in comparison with the latter. The need for demand expansion is also relatively greater, since demand deficiency is a relatively more important cause of the increase in non-natural unemployment, particularly in the 1990s. This kind of macroeconomic policy is likely to require a step-up in policies dealing with the balance of payments and inflation side effects. A policy for incomes and prices may also have a direct and indirect impact on all types of unemployment in excess of the natural rate.

Although policies to reduce disequilibrium non-natural unemployment are essential, it is clear that a substantial amount of natural rate (equilibrium) unemployment would remain. It has never fallen to zero, as depicted in Beveridge Curve in Chapter Seven. It is also evident that a significant component of this unemployment is involuntary, in the sense that it is the outcome of demand side decisions by employers. In this respect the necessity to review the policy on importing employment has become seriously urgent.

### **Alternative Policies to Deal with Natural Unemployment**

Accordingly, policies to reduce the equilibrium natural rate of unemployment are also necessary to reduce unemployment to the levels reached in the 1970s and early 1980s. The instruments of such a policy can be analysed from either a stock or a flow point of view. In terms of the former, in order to reduce the equilibrium natural rate of unemployment with a given labour force, equilibrium employment must rise. This can happen either through a supply side decrease or a demand side increase. A supply side decrease reduces real wages. On the other hand in the case of demand side decrease real wages rise.

On the supply side the most commonly advocated policies are reduction in population growth rate and further reduction in immigration. All of these policies, with a given level of vacancies, will lower reservation wages and hence increase the acceptance probability. Consequently, so far, these supply side policies have had nothing more than a modest effect on jobs and unemployment.

Besides these policies, attempts at work creation and training programmes have recently been carried out by the Ministry of Labour and Social Affairs in cooperation with a private consultancy agency, represented by the Bahrain Institute For Training (BIFT). Through this programme public vocational training is provided for a period of 3-6 months to unemployed job-seekers, with a wage rate of BD 80 per month for the first three months followed by a full wage



for a trial period of six months at private firms, besides the sum of BD 2000 for each employee to finance their training, payable by those private firms. In addition private firms of 100 and above employees are obliged to pay an annual vocational training levy of the sum of BD 6000 to BIFT. In fact, although in budgetary cost terms this programme is relatively costly, we argue the extent to what the increase on Bahrain Institute for Training and the Modern Craft Industries Centre (MCIC) schemes would provide a job guarantee for the long term unemployed. The great advantage of such programmes is that they can have an immediate impact on the unemployed. Also, work creation schemes, i.e. Community Programmes increased the labour demand and the offer probability, by increasing the economy wide demand for employees. Hence such schemes, which reduce the unemployed stock are reducing equilibrium unemployment. Of course there may be some spill over into non-natural unemployment but the principle effect is to reduce unemployment among those who have become structurally unemployed because of their long term status as such.

In principle, real wages rise as a consequence of demand increase may have additional demand side effects; but in practice this may not happen to a significant extent because workers on such programmes, or those out of work, will have little impact on real pay in the rest of the economy. The demand side effects of any increase in real wages may be beneficial in that they stimulate private spending.

In general there seem to be good grounds for a major expansion of such programmes to provide suitable training and to provide job opportunities for all long-term unemployed workers. Some major improvements could also be made in such schemes. There should be no earnings ceiling, in order to make them more attractive to adults, especially primary workers. This would provide long term unemployed workers with a form of job experience that could further enhance their long term employment prospects. However, the success of such programmes or any other schemes of this type in achieving their goal of reducing

natural unemployment depends mainly on firstly, the repatriation of competitive foreign workers, secondly on the existence of demand expansion in the economy and thirdly on the time dimension chosen.

If such programmes were expanded, some strategic attention would also need to be given to the kind of jobs offered and to the provision of relevant adult training in the scheme. A planned expansion of current government spending on BIFT makes some sense, and would turn such schemes into training and work experience programmes for youth and adults for whom the current job prospects are nil. A BIFT programme could provide a transition between long-term unemployment and long term employment but, of course, this requires a broader view-point of the private sector than currently available.

Although work creation by a special programme is desirable because of the strong impact on employment and because of the greater ease with which training provision can be monitored within the public sector, an introduction of a special programme would also generate jobs in the private sector, the construction industry being particularly important in this respect. A special programme could provide the job training in basic building skills that could then be used in construction projects. This is much more likely to happen if such a scheme is tied up with public investment projects such as Ministry of Housing projects. If this were the case, any increase in the demand could then become permanent.

In generating jobs within the private sector with a view to beating natural unemployment in the State of Bahrain, the provision of suitable training institutes is of paramount importance. In this regard, the extension of BIFT schemes within planned strategy carried out by an Employment Department at the Ministry of Labour and Social Affairs, and in coordination with a High Council for Vocational Training, is recommended. Apart from such extensions having a short-run effect on labour demand and offer probabilities for new

entrants to the labour market, which lower natural unemployment, there is also potentially a longer-run impact. This is because of the impact of training on labour productivity and on the long-run performance of the economy as a whole (which affects natural unemployment).

Although the Government of Bahrain has introduced training and schemes via the Ministry of Labour and Social Affairs there remain significant doubts about the effectiveness of this policy, especially in terms of generating permanent jobs. The principle of the training is not worth much unless participants can expect to get a job at its conclusion. The success of training schemes requires a complementary programme of demand expansion, especially for young Bahraini workers. Otherwise the attitudes of workers on training schemes will be adversely affected and any skills acquired there will depreciate with non-use. The growth in demand for young workers requires, in addition to a general expansion of aggregate demand, other measures such as an expanded job replacement of foreign workers scheme.

The success of the training schemes also depends on the control of government. It needs incentives and warnings. Unless the effectiveness of monitoring on training schemes is improved, it is unlikely to meet the long-term employment and unemployment targets. Training programmes by the Ministry of Labour and Social Affairs have failed to prevent a drop in apprenticeship training among young Bahrainis. The solution to this problem requires such training to be viewed as an entry route to apprenticeship, and for government subsidy to be provided for all apprenticeship schemes in both the private and public sectors. Other ways to enhance public training policy is a provision of credit for youth to help them choose their career, and to provide the extra careers needed.

On the other hand, the control of training programmes is also important to prevent a general expansion in demand, which can rapidly lead to severe excess demand in certain sectors of the labour market. Planning a programme of

training in tandem with a programme of planned sector demand expansion is likely to prove essential for a sustained cut in unemployment. However, also important for the long-term run success of these special programmes, is a public employment service to provide careers advice and guidance for trainees, in addition to a complementary expansion in job opportunities in both the public and private sector.

There are other kinds of special schemes, supporting the case for further employment incentives, including a higher labour tax on imported foreign workers, payable by employers. We have already mentioned in the previous chapters the effect of labour cost, especially fixed cost, on employment. High costs reduce the demand for Bahraini employees and so reduce the offer probability for unemployed workers. One of the components of these costs is the national social insurance contribution and the work permit costs for foreign workers. Increases in the latter reduce the advantages for foreign workers. Thus reducing the wide gap between the cost of the national and foreign workers stimulates substitution policy. Reductions in national social insurance contributions would have a significant effect on jobs and unemployment, simply because it applies to all Bahrain's workers and not to the marginal workers who are about to be laid off or who could be employed. This would lead to many economists arguing for the introduction of a marginal employment subsidy, which would be paid to firms for additional workers hired. This increases the offer probability, lowers natural rate unemployment, and has a particularly pronounced effect on the private sector, especially in services and construction sectors where employment growth is most rapid.

The research suggests a lump sum subsidy for all rises in the employment of Bahrainis above some defined benchmark for each employer. A marginal employment subsidy gives an obvious incentive to firms to substitute Bahraini employees for foreign workers working in the private sector. It also reduces labour costs, which boosts international competitiveness and ultimately

aggregate demand. However, we suggest the most effective subsidies would be those carefully targeted at problem groups in the labour market, e.g. the 15-19 age group. This does stimulate employment increases at budget costs below those of general macroeconomic demand management policies. A larger subsidy could be paid for the employment of long term unemployed people or recent graduates of public training programme; i.e. The Hotel and Catering Training Centre. These subsidies would permit a major reduction in the natural rate of unemployment. Cuts in employers' social insurance contributions could be targeted in a similar way. A proposal that employers who employ a long term (more than a year) unemployed worker should be relieved of national social insurance contributions for these workers for a period of two years is also recommended.

Work sharing or early retirement programmes are alternative ways of reducing natural unemployment. The scope of this programme is rather limited, even though successful. The idea is to reduce the starting age of eligibility of men and women. It is to be voluntary, not to an enforcement of earlier retirement by means of lowering the statutory retirement age. Gulf Air and Bahrain Petroleum Company are good examples of companies with such schemes. To increase the overall success rate of such programmes they could be made more attractive with extra allowances, and by financial incentives for firms to adopt them. An obvious advantage of the schemes is that they are much less costly than a general lowering of the statutory retirement age.

The recent labour market conditions in Bahrain favour such schemes but clearly there is some danger that labour productivity and output will fall as a result. Since new workers are likely to be less productive and may require some training or incur other induction costs for their employers, there is a case for paying firms a lump sum to compensate for these expenses and to offset any adverse long-term effects on the economy as a whole. However, such schemes could do much to encourage the long-term unemployed.

Currently, an obvious trend towards an undeclared policy of reducing women's labour force participation in the State of Bahrain, has to be rejected mainly on the grounds of discrimination. An alternative plan would consist in substituting more employees for shorter hours of work, through a cut in the standard working hours, which could prove an advantage in the private sector since a fall in actual hours increases overtime, and overtime hours are more productive, as some empirical studies have proved, e.g. Feldstein [70], so that this would raise the overall productivity of labour. However, evaluation of labour market measures through empirical research is essential, and therefore recommended in this thesis.

Our emphasis so far was on the labour market measures or policies to reduce the natural rate of unemployment. Now we turn our attention to the goods market and in particular to the role of industrial policy. The effect of industrial policy on reducing unemployment in the long run, as mentioned in the previous chapter, can be profound. In so far as it helps to generate additional aggregate demand and hence labour demand, it reduces non-natural unemployment. Not only does it help make domestic industry more internationally competitive, but also it relaxes any balance of payment constraints on government induced by demand expansion. For example, despite the significant deficit in the balance of payments, the progress of competitiveness in the manufacturing sector, particularly in the aluminium industry, has helped Bahrain's economy in recovery remarkably. Balance of payments has turned from a deficit of Million BD 155 in 1992 to a surplus of 39.8 in 1994. It also has long-run structural effects on equilibrium employment and unemployment. If it succeeds, industrial policy increases the pace of technical change, raises labour productivity and the natural level of output. In the long run all these improvements increase job opportunities, which in turn raise the offer probability for unemployed workers (especially if combined with a training strategy, as was the case in the beginning of 1980s). The policy should be clearly to reverse the effects of a decline in the long run rate of growth of output and employment, which seem to have

remarkable effects on the extent of the natural rate unemployment in Bahrain in the 1990s, as we mentioned in the previous chapters.

Currently the emphasis on extending the scope of industrial policy initiatives is targeted on the small and medium-sized industries in Bahrain. Although the direct effects of improved industry production performance on job creation may be small, the indirect effects could be great. The basis of this view is that labour demand expansion in non-production industries is constrained by foreign trade performance. Recently, as industrial policy was targeted at the exportable industries, it succeeded in reducing the severity of an unacceptable deterioration of the balance of payments, as shown earlier. The attainable level of non-productive employment was increased by the relaxation of the importing employment policy. As a result the economy wide demand for employees increased and equilibrium employment rose, accompanied by a lower wage. This was Bahrain's industrial policy during the last two decades. Obviously the complementary policies in the direction of tightening foreign labour by means of administrative and legislative burdens have had no clear demonstrative impact on reducing national rate unemployment, which has, in fact, risen rapidly throughout the last decade. It is equally unclear what the future impact of the current industrial policy, aiming at privatization, will be.

Currently the Government of Bahrain has been pursuing a privatization policy in a gradual and steady manner. First, some small government projects, for example dairy produce, dates and fishing were privatized in 1994. Obviously, the recent successful experiment of privatization of the communications sector encouraged the government to announce a plan in March 1995 to sell the government's share in a number of commercial banks and companies. It is evident from these examples that there is a general trend in Bahrain towards privatization.

Despite the limited scale of privatization carried out to date, for more successful privatization schemes it is suggested in this thesis that the government should undertake the task of setting up projects and buying shares in companies and banks in a bid to strengthen and underpin the national economy. At the second stage, once these schemes and companies had proved their success, they could begin to be diverted to the private sector, thus giving it a greater role in economic development as a complement to the role played by the government. On the other hand the private sector is requested to prove the ability to manage and carry out vital projects to maintain employment levels among Bahraini nationals.

In this regard the Bahrain Stock Exchange should undertake a major development and modernization programme aimed at developing its services, thus enhancing its role in the implementation of privatization policies.

However, there are problems involved in any privatization expansion. These problems can be summarised as an increase in the prices of commodities and services produced by the privatized enterprises, and its resulting impact on inflation. Other more important problems are rising unemployment levels as a result of reducing the number of employees, and also the long period of time taken by some privatized enterprises to consolidate their operations and improve their profitability levels, influencing the growth rate of the economy.

Having shed some light on Bahrain's prospective policy which aims to privatize, and create additional jobs for Bahrainis in a setting of economic growth, it is remarkable that despite the recession, recent diversification policy, as mentioned earlier in this thesis, achieved an increase of 9.3% annual growth rate in the industrial sector through the period 1987-1994 accompanied by 8.7% annual growth rate in the trade sector for the same period. The percentage contribution of the manufacturing sector to total GDP accounted for 16.6% while crude oil contributed a 17.1% of total GDP for the period 1987-1994. The non-oil GDP contribution climbed from 68% in 1975 to 84.2% of total GDP in 1994. These



figures reflect the great benefits that the industrial policy has achieved, taking into account its role in increasing equilibrium employment in the economy as a whole.

As we have seen, the evidence strongly favours the adoption of a non-market clearing perspective of unemployment. There is a general presumption in favour of industrial policies, which also rejects the classical view of the capacity of market forces to bring about spontaneously the kind of structural change (the development of new products and processes) that is required to achieve a permanent reduction in equilibrium unemployment.

However Bahrain's industrial policy has not departed much from interventionist industrial policies. According to the former policy, there are common themes that characterise most industrial policies. One central theme is the need for a conscious and planned strategy to encourage product and process innovation, especially in the internationally trading production sector.

In this regard a policy for greatly increased levels of fixed investment is generally thought important, and most interventionists favour the adoption of more generous public support, like the 1970s budgetary projects. In addition there is wide support for exploiting the existing financial institutions, like banks and pension funds in order to finance the investments needed, as was the case in the 1980s when public sector banking institutions played an active role. Another solution is the creation of new institutions to provide investment finance such as the establishment of the Bahrain Development Bank in 1990. However although these higher levels of fixed investments are necessary, they are not a sufficient condition for a successful industrial policy. In most industrial countries considerable emphasis is therefore placed on the encouragement of research and development, and the role of government in this matter is important. Whatever view is taken, an industrial (supply side of the goods market) policy is of considerable importance (particularly via the demand side of the labour market)

in permanently reducing unemployment, especially of the type of equilibrium natural rate.

A further alternative, and the most ambitious economic policy is Gulf market integration. This will contribute to the strengthening of the competitive power of the Gulf Cooperation Council (GCC) countries against global markets and to the easing of labour mobility through the GCC market. In this respect the real public and political consciousness of the role of an integrated market is an essential condition for ensuring sustained economic growth in the region. To achieve such prosperous goals employment rights should be the basis of GCC market integration, i.e. basic rights that provide the minimum form of social security benefits. These rights can be divided into individual and collective rights, our concern being mainly individual rights provisions, in terms of freedom of movement, health and safety, working conditions, working hours, employment status, security and equality of wage as well as in terms of equality of treatment regardless of nationality, origin, beliefs and sex. The collective rights could be much less specific and more conditional than the individual ones. However, such measures need a great deal more empirical studies, it is arguable that the State of Bahrain will benefit much more from such convergence, mainly because of its limited markets (both in goods and labour).

Finally, because there is no single cause of unemployment, there is no single solution. We saw in the previous chapter that unemployment varies with the demographic composition of the labour force and the efficiency of search activity. Unemployment may arise because workers and firms have incomplete labour market information. Alternatively, individuals may choose to search more thoroughly before accepting jobs, which may result in an increase in their economic well-being in the long run because they find positions that are more suitable for their tastes and skills. In this regard, the value of understanding the economics of job search is fairly important in helping to sort out the social and economic forces behind the relatively higher unemployment rates of youth.

We saw also how search unemployment relates to the rate of inflation in the short-term, while such a relationship disappears when employers and workers fully anticipate the future course of inflation in the economy. Obviously, the difficulty in obtaining such cooperation is fundamental to economics, as each individual worker or firm acting in his or her own best interest, has a strong incentive to ignore appeals to cooperate in anti inflation efforts. This is why voluntary incomes policies would fail and governments are requested to impose wage and price controls. In this regard the government's role in expanding monetary and fiscal policies might be effective. By altering expectations of future inflation, an incomes policy might persuade workers and firms to use restraint in seeking wage and price increases, thus softening the impact of restrictive monetary and fiscal policies on unemployment.

What is probably most interesting for policy-makers is that the increase in the unemployment rate has been influenced by a factor generally outside the control of government economic policy, that is the change in the age-sex composition of the labour force. However, if policy-makers regard the failure of the labour market to clear as a fundamental feature of the economy, a demand expansion, preferably regionally coordinated, is a crucial ingredient for a policy to reduce unemployment. There is also very good reason to believe that complementary policies are needed to regulate the movements of real incomes, which have a role in reducing both non-natural and natural unemployment. Policies that encourage special programmes, particularly those with a strong well structured training content, and industrial policies that encourage the development of new products and processes, hold the key to a permanent reduction in unemployment.

The complex package of policies needed to reduce unemployment requires a coordinated approach which recognises the complementarity of policy instruments, each being designed to deal with different causes of unemployment.

Findings in this thesis give very good reason to believe that a serious initiative is needed to regulate the immigration policy, which seems to have a role in reducing both non-natural and natural national unemployment. It is important to remember that left untreated in a stagnant economy, non-natural unemployment can convert into structural unemployment that raises the natural rate. Poor unskilled individuals leaving the labour force because of the low wages offered for the jobs open to them, rather than the complete lack of jobs and thus do not reduce their need for income maintenance and for retraining to higher skilled positions (social security supplementary incomes needed).

It is suggested in this thesis that in order to solve the unemployment problems that have arisen in Bahrain, and to approach an active labour market, the public and private sectors should work together to plan and implement job creation and training programmes. To be successful, training programmes must be tailored to meet the specific needs of business.

It is recommended in this thesis, that in order to achieve this goal much more microeconomic empirical work is needed. Also further macroeconomic research involving labour force and wages is needed to study their impact on unemployment and the decline in private sector jobs particularly in the production, trade and banking sectors. Other areas worthwhile investigating are the personal and social impact unemployment has on the individual.

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## **APPENDIX I**

### **Labour Supply**



## Regression Analysis

### Total Labour Supply

The regression equation is

$$\text{dif4lg16} = 0.977 - 0.183 \log 6 - 0.0042 \log 11 + 0.0460 \log 8$$

Predictor	Coef	Stdev	t-ratio	p
Constant	0.97741	0.09381	10.42	0.000
log6	-0.18336	0.01964	-9.34	0.000
log11	-0.00419	0.08000	-0.05	0.959
log8	0.04596	0.01543	2.98	0.009

s = 0.01298      R-sq = 90.6%      R-sq(adj) = 88.8%

#### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	0.0259725	0.0086575	51.40	0.000
Error	16	0.0026948	0.0001684		
Total	19	0.0286673			

SOURCE	DF	SEQ SS
log6	1	0.0243602
log11	1	0.0001176
log8	1	0.0014946

#### Unusual Observations

Obs.	log6	dif4lg16	Fit	Stdev.Fit	Residual	St.Resid
1	4.64	*	0.17473	0.01429	*	* X
2	4.64	*	0.17438	0.01182	*	* X
3	4.73	*	0.15960	0.01036	*	* X
5	4.93	0.09707	0.12292	0.00940	-0.02585	-2.89R
20	5.66	-0.00552	0.02006	0.00388	-0.02559	-2.07R

Durbin-Watson statistic = 1.81

## Male Labour Supply

### Regression Analysis

The regression equation is

$$\text{nw3lag17} = -0.948 + 0.113 \text{ nw3lag12} - 0.0102 \text{ nw3lag11} + 0.00149 \text{ nw3lag8} + 0.0639 \text{ nw3lag6}$$

21 cases used 3 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	-0.94788	0.08445	-11.22	0.000
nw3lag12	0.11334	0.05013	2.26	0.038
nw3lag11	-0.01016	0.05116	-0.20	0.845
nw3lag8	0.001493	0.008095	0.18	0.856
nw3lag6	0.063938	0.008609	7.43	0.000

s = 0.01077      R-sq = 92.0%      R-sq(adj) = 90.0%

### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	0.0213403	0.0053351	45.96	0.000
Error	16	0.0018574	0.0001161		
Total	20	0.0231977			

SOURCE	DF	SEQ SS
nw3lag12	1	0.0113555
nw3lag11	1	0.0001576
nw3lag8	1	0.0034244
nw3lag6	1	0.0064027

### Unusual Observations

Obs.	nw3lag12	nw3lag17	Fit	Stdev.Fit	Residual	St.Resid
5	0.202	-0.32938	-0.31019	0.00602	-0.01918	-2.15R
24	-0.004	-0.19522	-0.21585	0.00541	0.02063	2.21R

Durbin-Watson statistic = 1.63

## Regression Analysis

### Female Labour Supply

The regression equation is

$$\text{dif3lg18} = 3.64 - 0.696 \log 6 - 0.499 \log 11 + 0.237 \log 8$$

Predictor	Coef	Stdev	t-ratio	p
Constant	3.6395	0.5115	7.12	0.000
log6	-0.6958	0.1068	-6.52	0.000
log11	-0.4992	0.4836	-1.03	0.316
log8	0.23667	0.08967	2.64	0.017

s = 0.07899      R-sq = 77.4%      R-sq(adj) = 73.4%

#### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	0.36380	0.12127	19.44	0.000
Error	17	0.10606	0.00624		
Total	20	0.46987			

SOURCE	DF	SEQ SS
log6	1	0.30255
log11	1	0.01779
log8	1	0.04347

#### Unusual Observations

Obs.	log6	dif3lg18	Fit	Stdev.Fit	Residual	St.Resid
1	4.64	*	0.6600	0.0801	*	* X
2	4.64	*	0.6186	0.0607	*	* X
24	5.70	0.0007	0.1556	0.0381	-0.1550	-2.24R

Durbin-Watson statistic = 1.40

## Regression Analysis

### Bahraini Labour Supply

The regression equation is

$$\text{diflg33} = -0.00199 + 0.0517 \text{ diflg41} + 0.160 \text{ diflg40} - 0.0036 \text{ diflg8}$$

Predictor	Coef	Stdev	t-ratio	p
Constant	-0.001986	0.004842	-0.41	0.686
diflg41	0.05174	0.01461	3.54	0.002
diflg40	0.16045	0.05684	2.82	0.011
diflg8	-0.00361	0.03275	-0.11	0.914

s = 0.01342      R-sq = 55.0%      R-sq(adj) = 47.9%

#### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	0.0041906	0.0013969	7.75	0.001
Error	19	0.0034237	0.0001802		
Total	22	0.0076143			

SOURCE	DF	SEQ SS
diflg41	1	0.0027237
diflg40	1	0.0014647
diflg8	1	0.0000022

#### Unusual Observations

Obs.	diflg41	diflg33	Fit	Stdev.Fit	Residual	St.Resid
2	-0.917	-0.05310	-0.04944	0.01311	-0.00367	-1.27 X
11	0.120	-0.03237	0.00628	0.00494	-0.03865	-3.10R
16	-0.023	0.03364	0.00434	0.00294	0.02929	2.24R
23	-0.015	-0.00001	-0.00169	0.01071	0.00168	0.21 X

Durbin-Watson statistic = 1.70

## Regression Analysis

### Male Bahraini Labour Supply

The regression equation is

$$\text{diflg34} = -0.00162 + 0.0656 \text{ diflg41} + 0.0725 \text{ diflg40} + 0.0072 \text{ diflg8}$$

23 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	-0.001620	0.003390	-0.48	0.638
diflg41	0.06556	0.01023	6.41	0.000
diflg40	0.07253	0.03980	1.82	0.084
diflg8	0.00724	0.02293	0.32	0.756

s = 0.009399      R-sq = 71.8%      R-sq(adj) = 67.3%

#### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	0.0042639	0.0014213	16.09	0.000
Error	19	0.0016785	0.0000883		
Total	22	0.0059424			

SOURCE	DF	SEQ SS
diflg41	1	0.0039691
diflg40	1	0.0002860
diflg8	1	0.0000088

#### Unusual Observations

Obs.	diflg41	diflg34	Fit	Stdev.Fit	Residual	St.Resid
2	-0.917	-0.06670	-0.06174	0.00918	-0.00496	-2.44RX
11	0.120	-0.02174	0.00726	0.00346	-0.02899	-3.32R
21	-0.013	0.01905	-0.00055	0.00258	0.01960	2.17R
23	-0.015	0.00048	0.00106	0.00750	-0.00058	-0.10 X

Durbin-Watson statistic = 1.79

Male Bahraini Labour Supply - Age Group 15 to 19

Regression Analysis

The regression equation is

$$\text{df41g15} = 0.274 + 0.778 \text{ dif41g8} + 0.158 \text{ dif41g41} - 0.765 \text{ dif41g40} - 0.408 \text{ dummyT}$$

20 cases used 4 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	0.2742	0.1399	1.96	0.069
dif41g8	0.7785	0.4140	1.88	0.080
dif41g41	0.1581	0.1681	0.94	0.362
dif41g40	-0.7655	0.3185	-2.40	0.030
dummyT	-0.4077	0.1082	-3.77	0.002

s = 0.1598      R-sq = 59.1%      R-sq(adj) = 48.3%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	0.55450	0.13862	5.43	0.007
Error	15	0.38298	0.02553		
Total	19	0.93748			

SOURCE	DF	SEQ SS
dif41g8	1	0.04963
dif41g41	1	0.00000
dif41g40	1	0.14217
dummyT	1	0.36270

Unusual Observations

Obs.	dif41g8	df41g15	Fit	Stdev.Fit	Residual	St.Resid
5	0.031	-0.1141	-0.0810	0.1565	-0.0330	-1.03 X

Durbin-Watson statistic = 1.81

# Male Bahraini Labour Supply - Age Group 65+

## Regression Analysis

The regression equation is

$$\text{df41g65} = 31.9 + 0.269 \log 8 - 0.395 \log 12 + 0.262 \log 41 + 0.647 \log 40W^* - 7.60 \log T$$

20 cases used 4 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	31.87	12.86	2.48	0.027
log8	0.2694	0.2805	0.96	0.353
log12	-0.3946	0.5315	-0.74	0.470
log41	0.2619	0.5832	0.45	0.660
log40W*	0.6468	0.2520	2.57	0.022
logT	-7.604	3.062	-2.48	0.026

s = 0.07804      R-sq = 65.0%      R-sq(adj) = 52.5%

## Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	5	0.158337	0.031667	5.20	0.007
Error	14	0.085273	0.006091		
Total	19	0.243609			

SOURCE	DF	SEQ SS
log8	1	0.091194
log12	1	0.025614
log41	1	0.000162
log40W*	1	0.003803
logT	1	0.037564

## Unusual Observations

Obs.	log8	df41g65	Fit	Stdev.Fit	Residual	St.Resid
1	1.06	*	0.4012	0.6018	*	* X
2	1.06	*	0.0654	0.0989	*	* X
21	1.75	-0.3469	-0.1887	0.0384	-0.1582	-2.33R

Durbin-Watson statistic = 1.74

## Female Bahraini Labour Supply

### Regression Analysis

The regression equation is

$$\text{dif3lg35} = 20.5 - 4.28 \log T - 0.110 \text{ dif3lg41} - 0.707 \text{ dif3lg40} + 0.277 \text{ dif3lg8}$$

21 cases used 3 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	20.515	3.927	5.22	0.000
logT	-4.2842	0.8281	-5.17	0.000
dif3lg41	-0.1098	0.1190	-0.92	0.370
dif3lg40	-0.7072	0.2756	-2.57	0.021
dif3lg8	0.2770	0.2776	1.00	0.333

s = 0.08801      R-sq = 82.8%      R-sq(adj) = 78.5%

### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	0.59703	0.14926	19.27	0.000
Error	16	0.12394	0.00775		
Total	20	0.72097			

SOURCE	DF	SEQ SS
logT	1	0.50126
dif3lg41	1	0.04183
dif3lg40	1	0.04622
dif3lg8	1	0.00772

### Unusual Observations

Obs.	logT	dif3lg35	Fit	Stdev.Fit	Residual	St.Resid
4	4.63	0.6044	0.6372	0.0862	-0.0327	-1.84 X
18	4.76	0.2600	0.0917	0.0267	0.1683	2.01R

Durbin-Watson statistic = 1.52



## Regression Analysis

### Non Bahraini Labour Supply

The regression equation is

$$\log 50 = -0.734 + 0.106 \log NW^* + 0.0695 \log NW/W^* + 0.0141 \log 8 + 0.0893 \log 12$$

Predictor	Coef	Stdev	t-ratio	p
Constant	-0.73355	0.06538	-11.22	0.000
logNW*	0.10616	0.01335	7.95	0.000
logNW/W*	0.06954	0.04627	1.50	0.149
log8	0.014148	0.008327	1.70	0.106
log12	0.08929	0.04275	2.09	0.050

s = 0.01021      R-sq = 83.2%      R-sq(adj) = 79.7%

### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	0.0098239	0.0024560	23.56	0.000
Error	19	0.0019809	0.0001043		
Total	23	0.0118049			

SOURCE	DF	SEQ SS
logNW*	1	0.0085324
logNW/W*	1	0.0007540
log8	1	0.0000828
log12	1	0.0004549

### Unusual Observations

Obs.	logNW*	log50	Fit	Stdev.Fit	Residual	St.Resid
21	5.19	-0.13605	-0.15688	0.00311	0.02084	2.14R

Durbin-Watson statistic = 1.53

## 10 - Non-Bahraini Males Labour Supply Model

### Regression Analysis

The regression equation is

$$\text{nw4lg51} = -0.109 + 0.00610 \text{ nw4lgNW} + 0.00971 \text{ nw4lgNWW} + 0.00235 \text{ nw4lag8} - 0.00647 \text{ nw4lag12}$$

20 cases used 4 cases contain missing values

Predictor	Coef	Stdev	t-ratio	p
Constant	-0.10947	0.01494	-7.33	0.000
nw4lgNW	0.006098	0.001470	4.15	0.001
nw4lgNWW	0.009707	0.004748	2.04	0.059
nw4lag8	0.0023471	0.0009044	2.60	0.020
nw4lag12	-0.006471	0.004480	-1.44	0.169

s = 0.001428      R-sq = 84.6%      R-sq(adj) = 80.5%

### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	0.000167737	0.000041934	20.58	0.000
Error	15	0.000030569	0.000002038		
Total	19	0.000198306			

SOURCE	DF	SEQ SS
nw4lgNW	1	0.000130847
nw4lgNWW	1	0.000000745
nw4lag8	1	0.000031893
nw4lag12	1	0.000004252

### Unusual Observations

Obs.	nw4lgNW	nw4lg51	Fit	Stdev.Fit	Residual	St.Resid
20	10.5	-0.041285	-0.038563	0.000511	-0.002722	-2.04R

Durbin-Watson statistic = 1.65

## Regression Analysis

### Female Non Bahraini Labour Supply

The regression equation is

$$\log 52 = -4.87 + 0.607 \log NW^* + 0.481 \log NW/W^* + 0.507 \log 8 + 0.813 \log 12$$

Predictor	Coef	Stdev	t-ratio	p
Constant	-4.8680	0.7103	-6.85	0.000
logNW*	0.6071	0.1450	4.19	0.001
logNW/W*	0.4806	0.5026	0.96	0.351
log8	0.50704	0.09046	5.61	0.000
log12	0.8128	0.4644	1.75	0.096

s = 0.1109      R-sq = 82.7%      R-sq(adj) = 79.0%

### Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	4	1.11528	0.27882	22.66	0.000
Error	19	0.23377	0.01230		
Total	23	1.34906			

SOURCE	DF	SEQ SS
logNW*	1	0.70789
logNW/W*	1	0.01446
log8	1	0.35524
log12	1	0.03769

### Unusual Observations

Obs.	logNW*	log52	Fit	Stdev.Fit	Residual	St.Resid
21	5.19	-0.5917	-0.8208	0.0338	0.2291	2.17R

Durbin-Watson statistic = 1.41

## **APPENDIX II**

### **Unemployment**

SAS

TABLE OF AGEG BY EMPLOY

AGEG	EMPLOY		
Frequency   Row Pct	UNEMPLOY   ED	WORKING	Total
15-19	3178 63.85	1799 36.15	4977
20-24	5440 34.05	10538 65.95	15978
25-29	2197 11.80	16416 88.20	18613
30-59	2287 4.85	44842 95.15	47129
60+	292 7.36	3673 92.64	3965
Total	13394	77268	90662

STATISTICS FOR TABLE OF AGEG BY EMPLOY

Statistic	DF	Value	Prob
Chi-Square	4	18223.027	0.000
Likelihood Ratio Chi-Square	4	15025.533	0.000
Mantel-Haenszel Chi-Square	1	15524.694	0.000
Phi Coefficient		0.448	
Contingency Coefficient		0.409	
Cramer's V		0.448	

Sample Size = 90662

## SAS

TABLE OF PERNBAH BY EMPLOY

PERNBAH	EMPLOY		
Frequency  Row Pct	UNEMPLOY  ED	WORKING	Total
0%-	24 5.87	385 94.13	409
10%-	3061 19.82	12382 80.18	15443
20%-	2959 15.54	16078 84.46	19037
30%-	5028 16.09	26222 83.91	31250
40%-	1335 10.56	11306 89.44	12641
50%-	731 8.34	8039 91.66	8770
70%+	256 8.23	2856 91.77	3112
Total	13394	77268	90662

STATISTICS FOR TABLE OF PERNBAH BY EMPLOY

Statistic	DF	Value	Prob
Chi-Square	6	963.069	0.000
Likelihood Ratio Chi-Square	6	1022.248	0.000
Mantel-Haenszel Chi-Square	1	749.156	0.000
Phi Coefficient		0.103	
Contingency Coefficient		0.103	
Cramer's V		0.103	

Sample Size = 90662

SAS

TABLE OF MRTS BY EMPLOY

MRTS	EMPLOY		Total
	UNEMPLOY ED	WORKING	
Frequency			
Row Pct			
NEVER MRD.	10853 33.13	21909 66.87	32762
MARRIED	2311 4.13	53644 95.87	55955
DIVORCED	185 13.81	1155 86.19	1340
WIDOWED	45 7.44	560 92.56	605
Total	13394	77268	90662

STATISTICS FOR TABLE OF MRTS BY EMPLOY

Statistic	DF	Value	Prob
Chi-Square	3	13825.901	0.000
Likelihood Ratio Chi-Square	3	13667.724	0.000
Mantel-Haenszel Chi-Square	1	11224.808	0.000
Phi Coefficient		0.391	
Contingency Coefficient		0.364	
Cramer's V		0.391	

Sample Size = 90662

## SAS

## TABLE OF SEX BY EMPLOY

SEX	EMPLOY		
Frequency			
Row Pct	UNEMPLOY	WORKING	
	ED		Total
-----+			
MALES	9035	64083	73118
	12.36	87.64	
-----+			
FEMALES	4359	13185	17544
	24.85	75.15	
-----+			
Total	13394	77268	90662

## STATISTICS FOR TABLE OF SEX BY EMPLOY

Statistic	DF	Value	Prob
-----			
Chi-Square	1	1752.866	0.000
Likelihood Ratio Chi-Square	1	1571.429	0.000
Continuity Adj. Chi-Square	1	1751.875	0.000
Mantel-Haenszel Chi-Square	1	1752.847	0.000
Fisher's Exact Test (Left)			0.00E+00
(Right)			1.000
(2-Tail)			0.00E+00
Phi Coefficient		-0.139	
Contingency Coefficient		0.138	
Cramer's V		-0.139	

Sample Size = 90662



## SAS

TABLE OF EDUCAT BY EMPLOY

EDUCAT	EMPLOY		
Frequency			
Row Pct	UNEMPLOY	WORKING	Total
	ED		
ILLIT	815	7650	8465
	9.63	90.37	
R&W+PRIM.	2968	18885	21853
	13.58	86.42	
PREB+	2037	10626	12663
	16.09	83.91	
SECOND.	6825	24490	31315
	21.79	78.21	
ABOVE SEC.	389	5438	5827
	6.68	93.32	
UNIV.+	354	10104	10458
	3.38	96.62	
Total	13388	77193	90581

Frequency Missing = 81

STATISTICS FOR TABLE OF EDUCAT BY EMPLOY

Statistic	DF	Value	Prob
Chi-Square	5	2825.744	0.000
Likelihood Ratio Chi-Square	5	3198.141	0.000
Mantel-Haenszel Chi-Square	1	58.900	0.000
Phi Coefficient		0.177	
Contingency Coefficient		0.174	
Cramer's V		0.177	

Effective Sample Size = 90581

Frequency Missing = 81

## LOGISTIC REGRESSION ANALYSIS

## CATMOD PROCEDURE

Response: EMPLOY	Response Levels (R)= 2
Weight Variable: None	Populations (S)= 3150
Data Set: ONE	Total Frequency (N)= 90489
	Observations (Obs)= 90489

## MAXIMUM LIKELIHOOD ANALYSIS OF VARIANCE TABLE

Source	DF	Chi-Square	Prob
INTERCEPT	1	315.83	0.0000
AGEG	4	2835.98	0.0000
SEX	1	8.65	0.0033
AGEG*SEX	4	330.18	0.0000
MRTS	3	2302.17	0.0000
SEX*MRTS	3	49.55	0.0000
PEREXPAT	1	5.83	0.0157
EDUCAT	5	242.71	0.0000
SEX*EDUCAT	5	94.35	0.0000
SPGM(EDUCAT=4)	3*	116.10	0.0000
SPGM(EDUCAT=5)	7*	35.76	0.0000
SPGM(EDUCAT=6)	6*	49.15	0.0000
LIKELIHOOD RATIO	3107	2692.53	1.0000

NOTE: Effects marked with \* contained 1 or more singularities (i.e., redundant parameters).

## LOGISTIC REGRESSION ANALYSIS

## ANALYSIS OF MAXIMUM LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi-Square	Prob
INTERCEPT	1	-2.0074	0.1130	315.83	0.0000
AGEG	2	1.8381	0.0869	447.23	0.0000
	3	0.6819	0.0796	73.32	0.0000
	4	-0.2713	0.0799	11.53	0.0007
	5	-0.9436	0.0800	139.30	0.0000
SEX	6	-0.2616	0.0890	8.65	0.0033
AGEG*SEX	7	-0.5675	0.0869	42.62	0.0000
	8	-0.3976	0.0796	24.95	0.0000
	9	-0.2520	0.0799	9.95	0.0016
	10	0.2765	0.0799	11.97	0.0005
MRTS	11	0.9915	0.0524	357.73	0.0000
	12	-0.6408	0.0517	153.55	0.0000
	13	0.3155	0.0754	17.50	0.0000
SEX*MRTS	14	-0.1488	0.0524	8.06	0.0045
	15	-0.3023	0.0517	34.18	0.0000
	16	0.1731	0.0754	5.27	0.0217
PEREXPAT	17	0.00289	0.00120	5.83	0.0157
EDUCAT	18	1.1267	0.0802	197.57	0.0000
	19	0.6725	0.0655	105.56	0.0000
	20	0.5354	0.0652	67.45	0.0000
	21	-0.1370	0.0993	1.90	0.1677
	22	-0.5236	0.1703	9.46	0.0021
SEX*EDUCAT	23	-0.0838	0.0607	1.91	0.1673
	24	-0.2375	0.0422	31.61	0.0000
	25	-0.2264	0.0419	29.21	0.0000
	26	0.0789	0.0279	7.99	0.0047
	27	0.1714	0.0586	8.57	0.0034
SPGM(EDUCAT=4)	28	0.4437	0.1038	18.28	0.0000
	29	0.0549	0.1071	0.26	0.6084
	30	0.4636	0.1087	18.18	0.0000
	31	.	.	.	.
	32	.	.	.	.
	33	.	.	.	.
	34	.	.	.	.
	35	.	.	.	.
	36	.	.	.	.
	37	.	.	.	.
	38	.	.	.	.
	39	.	.	.	.
	40	.	.	.	.
	41	.	.	.	.
	42	.	.	.	.
	43	.	.	.	.
	44	.	.	.	.
	45	.	.	.	.
	46	.	.	.	.
SPGM(EDUCAT=5)	47	.	.	.	.
	48	.	.	.	.

## LOGISTIC REGRESSION ANALYSIS

## ANALYSIS OF MAXIMUM LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi- Square	Prob
<hr/>					
	49	.	.	.	.
	50	.	.	.	.
	51	-0.0427	0.3081	0.02	0.8899
	52	-1.0394	0.4694	4.90	0.0268
	53	-0.4975	0.3201	2.41	0.1202
	54	-0.3339	0.2236	2.23	0.1354
	55	-0.0189	0.2658	0.01	0.9434
	56	-1.1789	0.2730	18.65	0.0000
	57	0.0269	0.2356	0.01	0.9090
	58	.	.	.	.
	59	.	.	.	.
	60	.	.	.	.
	61	.	.	.	.
	62	.	.	.	.
	63	.	.	.	.
	64	.	.	.	.
	65	.	.	.	.
SPGM(EDUCAT=6)	66	.	.	.	.
	67	.	.	.	.
	68	.	.	.	.
	69	.	.	.	.
	70	.	.	.	.
	71	.	.	.	.
	72	.	.	.	.
	73	.	.	.	.
	74	.	.	.	.
	75	.	.	.	.
	76	.	.	.	.
	77	.	.	.	.
	78	-1.0408	0.3965	6.89	0.0087
	79	0.1572	0.2585	0.37	0.5433
	80	0.8244	0.2447	11.35	0.0008
	81	0.5723	0.2574	4.94	0.0262
	82	-0.2177	0.3501	0.39	0.5341
	83	0.3867	0.2657	2.12	0.1455
	84	.	.	.	.

LEAST SQUARE MULTIPLE REGRESSION ANALYSIS

General Linear Models Procedure  
Class Level Information

Class	Levels	Values
AGEG	5	4 5 6 7 8
SEX	2	1 2
MRTS	4	1 2 3 4
EDUCAT	6	1 2 3 4 5 6
SPGM	20	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 23

Number of observations in data set = 90662

NOTE: Due to missing values, only 90489 observations can be used in this analysis.

# LEAST SQUARE MULTIPLE REGRESSION ANALYSIS

## General Linear Models Procedure

Dependent Variable: EMPLOY

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	42	3043.9502371	72.4750056	785.25	0.0
Error	90446	8347.7771330	0.0922957		
Corrected Total	90488	11391.7273702			
	R-Square	C.V.	Root MSE	EMPLOY Mean	
	0.267207	205.6767	0.3038021	0.14770856	

# LEAST SQUARE MULTIPLE REGRESSION ANALYSIS

## General Linear Models Procedure

Source	DF	Type I SS	Mean Square	F Value	Pr > F
AGEG	4	2288.7446947	572.1861737	6199.49	0.0
SEX	1	141.7526958	141.7526958	1535.85	0.0
AGEG*SEX	4	132.6115935	33.1528984	359.20	0.0001
MRTS	3	306.1834717	102.0611572	1105.81	0.0
SEX*MRTS	3	7.1153976	2.3717992	25.70	0.0001
PEREXPAT	1	10.1400237	10.1400237	109.86	0.0001
EDUCAT	5	94.0152943	18.8030589	203.73	0.0001
SEX*EDUCAT	5	44.0546538	8.8109308	95.46	0.0001
SPGM(EDUCAT)	16	19.3324121	1.2082758	13.09	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
AGEG	4	741.79281596	185.44820399	2009.28	0.0
SEX	1	5.36223586	5.36223586	58.10	0.0001
AGEG*SEX	4	73.95607110	18.48901778	200.32	0.0001
MRTS	3	250.04331690	83.34777230	903.05	0.0
SEX*MRTS	3	6.40004719	2.13334906	23.11	0.0001
PEREXPAT	1	0.25612385	0.25612385	2.78	0.0957
EDUCAT	5	108.10857652	21.62171530	234.27	0.0001
SEX*EDUCAT	5	39.98307379	7.99661476	86.64	0.0001
SPGM(EDUCAT)	16	19.33241207	1.20827575	13.09	0.0001

LEAST SQUARE MULTIPLE REGRESSION ANALYSIS

General Linear Models Procedure

Parameter		Estimate	T for H0: Parameter=0	Pr >  T	Std Error of Estimate
INTERCEPT		-.2563151178 B	-4.62	0.0001	0.05550658
AGEG	4	0.7104235851 B	13.29	0.0001	0.05345868
	5	0.4281505960 B	8.11	0.0001	0.05281450
	6	0.1880738297 B	3.57	0.0004	0.05267284
	7	0.0855866599 B	1.63	0.1026	0.05242369
	8	0.0000000000 B	.	.	.
SEX	1	0.2631855434 B	4.58	0.0001	0.05744967
	2	0.0000000000 B	.	.	.
AGEG*SEX	4 1	-.3316444613 B	-6.14	0.0001	0.05405419
	4 2	0.0000000000 B	.	.	.
	5 1	-.3113431010 B	-5.85	0.0001	0.05324288
	5 2	0.0000000000 B	.	.	.
	6 1	-.1987477916 B	-3.75	0.0002	0.05303687
	6 2	0.0000000000 B	.	.	.
	7 1	-.0976497717 B	-1.85	0.0640	0.05271133
	7 2	0.0000000000 B	.	.	.
	8 1	0.0000000000 B	.	.	.
	8 2	0.0000000000 B	.	.	.
MRTS	1	0.2498994713 B	12.90	0.0001	0.01937916
	2	0.0668613832 B	3.51	0.0004	0.01903137
	3	0.0898763096 B	4.11	0.0001	0.02186092
	4	0.0000000000 B	.	.	.
SEX*MRTS	1 1	-.1336734166 B	-5.09	0.0001	0.02628461
	1 2	-.0992830732 B	-3.84	0.0001	0.02584837
	1 3	-.0230983087 B	-0.76	0.4449	0.03023845
	1 4	0.0000000000 B	.	.	.
	2 1	0.0000000000 B	.	.	.
	2 2	0.0000000000 B	.	.	.
	2 3	0.0000000000 B	.	.	.
	2 4	0.0000000000 B	.	.	.
PEREXPAT		0.0001672614	1.67	0.0957	0.00010041
EDUCAT	1	0.2534058239 B	14.57	0.0001	0.01739776
	2	0.2517639515 B	17.35	0.0001	0.01450780
	3	0.2444181224 B	17.04	0.0001	0.01434315
	4	0.1198169301 B	7.62	0.0001	0.01571740
	5	0.0590715321 B	3.18	0.0015	0.01857820
	6	0.0000000000 B	.	.	.
SEX*EDUCAT	1 1	-.1506580380 B	-9.70	0.0001	0.01553302
	1 2	-.1810985728 B	-15.22	0.0001	0.01189829
	1 3	-.1835957806 B	-15.50	0.0001	0.01184554
	1 4	-.1068605599 B	-13.53	0.0001	0.00789875
	1 5	-.0279079844 B	-2.56	0.0105	0.01091031



# LEAST SQUARE MULTIPLE REGRESSION ANALYSIS

## General Linear Models Procedure

Parameter		Estimate	T for H0: Parameter=0	Pr >  T	Std Error of Estimate
	1 6	0.0000000000 B	.	.	.
	2 1	0.0000000000 B	.	.	.
	2 2	0.0000000000 B	.	.	.
	2 3	0.0000000000 B	.	.	.
	2 4	0.0000000000 B	.	.	.
	2 5	0.0000000000 B	.	.	.
	2 6	0.0000000000 B	.	.	.
SPGM( EDUCAT)	23 1	0.0000000000 B	.	.	.
	23 2	0.0000000000 B	.	.	.
	23 3	0.0000000000 B	.	.	.
SPGM( EDUCAT)	1 4	0.0564731482 B	5.02	0.0001	0.01124304
	2 4	0.0106637698 B	0.92	0.3559	0.01155116
	3 4	0.0600279110 B	5.11	0.0001	0.01175772
	4 4	0.0000000000 B	.	.	.
	5 5	-.0024203949 B	-0.11	0.9118	0.02185724
	6 5	0.0054195917 B	0.27	0.7873	0.02008870
	7 5	-.0008579192 B	-0.05	0.9631	0.01854985
	8 5	-.0302345624 B	-1.91	0.0563	0.01584299
	9 5	0.0012941684 B	0.07	0.9459	0.01906238
	10 5	-.0857122626 B	-4.68	0.0001	0.01831822
	11 5	-.0078890330 B	-0.48	0.6333	0.01653791
	12 5	0.0000000000 B	.	.	.
	13 6	-.0191363112 B	-1.34	0.1813	0.01431621
	14 6	0.0151927734 B	1.33	0.1825	0.01139595
	15 6	0.0198347412 B	1.65	0.0985	0.01200643
	16 6	0.0106059086 B	0.84	0.4005	0.01261554
	17 6	-.0029540829 B	-0.20	0.8446	0.01506762
	18 6	0.0026636258 B	0.21	0.8301	0.01241475
	19 6	0.0000000000 B	.	.	.